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Contractors and Engineers Monthly

Vol. 49, No. 3 MARCH, 1952 $4 a year, 50 Cents a Copy

Covering the Field

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  The airport has a unique hangar partly open-faced, partly closed. Page 101.
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- **Tunnel for Dam**
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(You will find "In This Issue" on page 4)

Union Electric Co. Photo

Routine construction operations have their drama too. Protected by safety belts, workmen tie reinforcing steel in a basement wall of the Meramec Power Plant. Page 66 reports the construction of this 520,000-kw plant at the junction of the Meramec and Mississippi Rivers. United Engineers & Constructors of Philadelphia is the general contractor.

NEWS AND VIEWS

of the construction industry at home and abroad — sufficiency rating system, Federal-Aid highway bills, second-quarter prospects.

Three D8's team up to free the locomotive of the famed City of San Francisco which was stalled by deep snow in the Sierras last January. A. Teichert & Sons and Lentz Construction Co., both of Sacramento, supplied the tractors.

It goes without saying that only a fraction of the road steel needed in the April-May-June quarter has been allotted. But all things being relative, the situation might be worse. In the first place, the allotment could have gone down—and it didn't. It climbed by about 40,000 tons (17,000 of them in structural steel). In the second place, the **BPR has a promising new technique for backing its quarterly steel requests.**

Government officials have consistently displayed a show-us attitude about those requests. The BPR's answer is a **sufficiency rating system.** Here's how it works. A road that meets modern engineering standards as to structural condition, safety, and service goes to the head of the class with a grade of 100. (All new construction would presumably be so graded.) The poorer the road, the lower the grade it receives, and the more urgent its need for improvement—hence for steel. This grading scheme strikes us as remarkably persuasive. Doubtless many NPA officials are conscientious parents who know as well as the rest of us what's expected when Junior brings home a report card of D's. Presumably they'll be no less thunderstruck and conscientious about highways that are flunking.

In fact, we think **this report-card method a good one for general use in enlisting public support for road programs,** and we're pleased to be agreed with by Ray E. Jorgensen, Engineering Counsel of the National Highway Users Conference. The American people will support an intelligent highway-planning program once they understand road deficiencies and needs, he says. What more understandable way to present needs than by this report-card system? Presentation is nine-tenths of persuasion, we remember reading some place.

For Government doubters the **BPR is also documenting the role of roads in defense.** After a survey of the Shirley Highway in Virginia, a 17-mile controlled-access divided highway, BPR engineers are able to cite a saving of 311,000 hours and $2,000,000 a year for truckers alone. In other words, each ton of steel used to build the Shirley Highway is saving 83 truck and driver hours a year, or more than 10 average working days. If such a saving isn't defense-supporting, what is? And what about similar modern facilities now held up for lack of steel? Even a Kallikak would catch the implications of the study.

Talk of Federal money for road construction sounds supremely irrelevant in these days when steel, not specie, buys us our roads. But let's review the **Federal-Aid highway bills for fiscal 1954-55** that are kicking around now in the House and Senate. S. 2437 totals $600 million and H. R. 6094 totals $400 million. They straddle the $500 million authorized for fiscal 1952-53 by the 1950 Act. Totals are divided this way: for the **primary system,** $200 million in the House bill and $270 million in the Senate . . . for the **secondary system,** $100 million in the House bill and $180 million in the Senate . . . for **urban areas,** $100 million in the House bill and $150 million in the Senate . . . for the **interstate system,** nothing in either bill. The economy House bill was requested by the Department of Commerce and presumably expresses the philosophy and desires of the Administration. The Senate bill, while more generous, still does not match up with the AASHO recommendation of $810 million, of which $210 million would be allotted to the interstate system. However, the AASHO thinks it unlikely that any other bill more nearly embracing its recommendations will be introduced. Perhaps this is even "desirable", it adds, "in the light of recent developments."

As for construction as a whole, 77.4 per cent of the applications filed for this quarter had to be denied. In the coming quarter there will be virtually no new starts in **commercial or industrial buildings,** though projects awarded allotments this quarter should get enough to continue next quarter. **Housing** will get enough material to sustain about 60 per cent of 1951 production. Allotments for **construction machinery** and **repair parts** will be 10 to 20 per cent below those for this quarter. Why? Because demands for carbon steel are now about 137 per cent of supply, for structural steel 169 per cent, for steel plate 185 per cent, for copper 150 per cent, and for aluminum 153 per cent. The tooling-up for defense mobilization is now nearing completion; hence the **heavier demands by the military and defense-supporting programs.** Another little matter—the attrition factor made it possible during World War II to set allotments 10 to 15 per cent higher than the available supply. But the system isn't working out this time because there are so many more claimant agencies competing for available supplies. So to preserve the solvency of CMP, officials set second-quarter allotments at only 5 per cent over supply.

A new single order entitled CMP Regulation 6 (Revised) may replace NPA Order M-4A, CMP Regulation 6, and Direction 1 to Regulation 6. As we write, nothing is definite, but rumor hath it that the new order will contain no provision for housing (a separate order for that will be issued) . . . that it will contain a provision for the use of foreign or salvage steel in essential construction on specific application to NPA . . . that it will place a dollar limit on the B-products and noncontrolled materials that can be self-authorized . . . and that **all its provisions will be "rephrased into simple language".** That last we'll believe when we see it.

Before we close, did you know that a French-Italian-Swiss company will begin work this spring on **an auto tunnel 7 miles long,** which outclasses the world's present record-holder, the 2.16-mile highway tube under the Mersey at Liverpool, England? The tunnel will pierce Mont Blanc, highest of all the Alps. Won't Caesar and Hannibal relish this news? . . . One other little item, about **a bridge completed almost before it began.** Not a very big bridge, the New Jersey Parkway crossing of the Jakes Branch of Toms River, but Ole Hansen & Sons of Pleasantville happened to have men and machines working on a nearby Parkway section, so as soon as they were awarded the job, November 1, they hopped over and started in—without waiting until the formal contract was drawn up and signed. That contract almost never did catch up with them. Barely one week after the official working days began, the Hansens completed the bridge.

This Manitowac Speedcrane powered by a Cummins diesel sorts tons of scrap a day in the yard of a Detroit scrap iron and metal company. Where's your scrap, by the way? Out where it's needed, contributing to the defense effort?

Buckling Strength Covered in New Book

"Buckling Strength of Metal Structures", a new 508-page book published by McGraw-Hill Book Co., discusses the behavior of fabricated steel structures under compression loading. This volume is one of the series of engineering societies' monographs produced under the sponsorship of the ASCE, ASME, AIME, and the AIEE.

The author, the late Freidrich Bleich, worked in close cooperation with the Navy's David Taylor Model Basin (Bureau of Ships), the staff of Frankland & Lienhard, consulting engineers, and the Column Research Council in developing this reference volume of tables and simplified approximate formulas and methods. He has extended the theories of elastic buckling into the inelastic range, and, in so doing, covers the latest methods for analyzing the stability of high-strength alloys used in a wide range of structures and in ships' hulls.

The 12 chapters, all fully illustrated, deal with buckling of centrally or eccentrically loaded columns; stability problems; buckling of centrally loaded columns by torsion and flexure; lateral buckling of beams; built-up columns and columns of variable stiffness; and allied topics.

The book is priced at $10 and may be secured from McGraw-Hill Book Co., 327 W. 41st St., New York 18.

AGC Seeks to Offset Supreme Court Decision

A Supreme Court decision regarding contracts with the Federal government was the subject of two identical letters which the Associated General Contractors of America, Inc., addressed recently to Chairmen Pat McCarran and Emanual Celler, of the Senate and House Judiciary Committees respectively. In the opinion of the Association, this Supreme Court decision has so limited Government contracts that there is immediate need for legislation by Congress to clarify the provisions of Federal construction and procurement. According to the decision, the head of a department is now unable to call for a judicial review of findings of fact, except in cases where fraud on the part of the Government can be alleged and proved.

The Supreme Court decision in question was in the case of The United States, Petitioner, v. Martin Wunderlich, Ann M. Wunderlich, Marie Wunderlich, et al, No. 11, October Term, 1951. The decision was handed down November 26, 1951. The majority opinion in this case was given by Justice Minton, with Justices Douglas, Reed, and Jackson dissenting. In essence, the Supreme Court further limited the interpretation of Article 15—the disputes article of the standard Government construction contract—to mean "The decision of the department head, absent fraudulent conduct, must stand under the plain meaning of the contract". The Court further stated: "By fraud we mean conscious wrongdoing, an intention to cheat or be dishonest."

Justice Douglas' strong dissent emphasized that the decision has "wide application and a devastating effect" because it gives the contracting officer, who is normally supported by the department head, absolute authority to determine facts relating to execution of a contract. As it would obviously be impossible to allege and prove fraud (as defined by the Supreme Court) upon the part of the Government, the effect of the decision is to prohibit review of a dispute by the courts.

Justice Minton stated in the majority opinion that "if the standard of fraud that we adhere to is too limited, that is a matter for Congress". Accordingly the AGC has recommended to the two Judiciary Committees the introduction of bills embodying the following principles:

1. Any Government contract should be subject to appeal to the courts from rulings of the contracting officer or head of department.
2. All existing contracts should be modified accordingly.
3. Any matters arising out of Government contracts which were legally in process at the time of the decision should have their status renewed as of the date of such decision, and the contract should be construed in accordance with principles 1 and 2.

New Army Construction Setup

In view of the larger military-construction programs being assigned to the Corps of Engineers during the current emergency, military-construction functions and divisions have been regrouped and consolidated.

Colonel McDonald D. Weinert, formerly Chief of the Engineering Division, fills the newly created post of Deputy Chief of Military Construction and will work under Brigadier General John R. Hardin, Assistant Chief of Engineers for Military Construction. Colonel Weinert's former Division (the Engineering Division) has been merged with the Construction Operations Division into one office, to be known as the Military Construction Divisions. Colonel William J. Ely, former Chief of Construction Operations, heads the new divisions.

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Something Screwy in Steel

In our January lead editorial we commented that some 576 highway projects under way last year were held up for steel, and that the highway allotment for 1952 is even less than that for 1951. Since that writing the outlook for steel has become even gloomier. The urgent appeal of a state governors' conference for more steel for highway needs was flatly rejected by Manly Fleischmann, Defense Production Administrator. The Fair Deal bureaucrat stated that road improvements are of no importance to the defense effort, and that highways are expendable. Four-lane highways, moreover, such as the Ohio Turnpike and the New York State Thruway, are considered luxuries in the eyes of the administration allocator.

The Ohio Turnpike Commission needs 225,000 tons of structural and reinforcing steel to construct its 241-mile toll road across the northern part of Ohio, but cannot buy any in the United States. Strangely enough, four foreign countries—Belgium, Japan, Luxembourg, and Germany (two being recent enemy nations, at that)—have offered to sell steel to Ohio at a cost of approximately $190 a ton delivered. In Pittsburgh, steel sells for about $73 a ton. Paradoxically, the eastern terminus of the Ohio Turnpike is just south of Youngstown, one of the largest steel-producing centers in the world.

The ban against the use of foreign-produced steel in state public-works projects has been suspended by the New York State Thruway Authority. Contractors are expected to import steel for the construction of the $50,000,000 Tarrytown-Nyack Thruway bridge. This new span over the Hudson River will require about 2,200 tons of reinforcing steel and 585 tons of structural steel. Construction of the 450-mile cross-state highway has been delayed by the domestic steel shortage.

In Michigan, the State Highway Department also found it impossible to buy steel in this country for emergency bridge repairs, and was forced to buy 60 tons from European mills at a price 40 per cent higher than that of domestic steel. During the first nine months of 1951 we shipped abroad 140,000 tons of scarce heavy structural and reinforcing steel under foreign-aid programs, but the National Production Authority denies that any of this is being bootlegged back here for resale.

To make matters worse, President Truman promised Prime Minister Churchill that Britain in 1952 may purchase in this country 1,000,000 long tons of steel. Converting the British long ton of 2,240 pounds, this amounts to 1,120,000 American tons of the hard-to-get metal. The Administration claims that this diversion of steel from domestic markets will not require further cuts in allocations to United States industry for the first six months of this year. The big bundle for Britain is expected to be shipped abroad during the second half of 1952.

In addition, the Churchill-Truman agreement will cost our steel mills thousands of tons of scrap that this order represents. Already eight steel-making furnaces are down in this country, and one newly built open-hearth furnace cannot get into production because of the lack of iron and steel scrap.

What to do about it? It may behoove the construction industry, and those interested in an adequate highway program, to copy the methods of other industries in getting better treatment from the DPA and the NPA. The automobile industry, for instance, and its union of United Automobile Workers have exerted high-level political pressure on the President and Congress which has produced results in getting more steel allocated for the manufacture of automobiles. The argument that serious unemployment would result in the auto industry through the curtailment of steel is equally applicable to the construction industry.

It is not only ridiculous but also dangerous to turn out more cars, while at the same time cutting highway construction. The military "defense" program and our civilian economy depend on adequate transportation, and highways certainly are a vital factor in this country's transportation. The administration now in Washington must be made to see that the neglect of the highway system during and after World War II was a serious mistake that cannot with impunity be repeated.

How You Can Help In the Scrap Drive

Scrap recovery is everyone's business these days. If you want to know specifically what you can do to help flush scrap out into processing channels, here are some suggestions which the American Road Builders' Association developed in cooperation with the Scrap Recovery Subcommittee of the American Association of State Highway Officials.

In the first place, look to your own scrap *now*. Whether you're a highway-department man, a contractor, a material producer, an equipment dealer, or a manufacturer, ferret out those obsolete repair parts, dead or dying machines, unusable forms, old metal containers, stored and forgotten fixtures, etc. Though not a disposal agency, your state highway department will help you with disposal problems. So dispose of your scrap through regular commercial channels and report these transactions promptly to the maintenance engineer of your state highway department.

As for the other fellow's scrap, you can help with that too. Keep an eye out for abandoned equipment and vehicles along right-of-ways, and for abandoned mines or similar installations near highways. Ownership and title are often hard to ascertain in such cases, but the Salvage Division of NPA will do the follow-up work on large quantities of scrap—if you will do your part and report them.

You can do more than report them, too. You can offer hauling assistance—especially in remote areas where lack of transportation discourages otherwise willing groups and individuals.

Let's all fall to in this campaign. Let's all stop talking so much about the steel shortage and do what we can to keep it from becoming even more critical.

Whose Highways?

(The following appeared in the February issue of The Highway Magazine. We think it is worth repeating.)

Are you a beneficiary of good highways?

The question seems elementary. The clothes you wear, the food you eat, the materials in your home were all transported at some point over roads. It is hard to imagine anyone who does not benefit from our modern highway system.

Yet many would have us believe that highways should be paid for exclusively by the motorist, the so-called "highway user", through the means of a gasoline tax.

It would seem as just to make the victim of a fire pay the cost of the fire department—he being the "user".

Hal Hale, Executive Secretary of the AASHO, writing in The Highway Magazine in January, compared the financing of highways with that of schools. We don't consider it unusual for the bachelor or spinster to contribute to the cost of educating the youth of the community. Highways would seem to be likewise a community betterment project.

We do not advocate doing away with the gasoline tax. Rather we say, there is no one way to finance our badly needed new highways. Certainly, motorists should pay their fair share—so should the truckers, and likewise the general public.

Setting these "fair shares" will require much careful thought and research.

The Chamber of Commerce of the United States proposes a million-dollar national-level study to develop an equitable highway finance plan.

In This Issue

We heartily concur. Such a study is long overdue. A project such as this, if carefully planned and scientifically carried out, can do much to point the way to more and better roads.

Such a study must be clearly unbiased . . . no "axes" . . . no special interests. It must be complete . . . no avenues left unexplored. And the conclusions must be carefully drawn.

It would seem that an independent research organization, experienced in making studies of this type, should be employed.

And it should be done SOON.

Highway Costs Rose in 1951

The Bureau of Public Roads recently released some figures relating to highway costs in 1951, which show a general upward trend. A summary of the BPR figures is as follows:

Common excavation: 1951 average cost per cubic yard, 40 cents, as against 54 cents in 1950. The 1951 figure was 4 cents lower than in 1943, the 20-year peak figure, and the 1951 last-quarter trend was downward.

Concrete pavement: average cost per square yard in 1951, $3.93; 1950, $3.66. The 1951 rate was a 20-year peak figure and the last-quarter trend was upward.

Reinforcing steel: 1951, 12 cents per pound; 1950, 10 cents. The 1951 rate was a 20-year peak figure and the last-quarter trend was upward.

Structural steel: 1951, 18 cents per pound; 1950, 14 cents. The 1951 rate was a 20-year peak figure and the trend was upward.

Structural concrete: 1951, $52.07 per cubic yard; 1950, $44.62. The 1951 rate was a 20-year peak figure and the trend was upward.

The composite-mile index increased from 145.7 in 1950 to 163.3 in 1951, which was a 20-year peak figure. The last-quarter trend was upward. The base for a composite mile is the 1925-1929 period and equals 100.

Joint-Material Bibliography

The Highway Research Board's Committee on Joint Material in Concrete Pavements has compiled a bibliography of literature on the subject. HRB Bibliography No. 12—"Joint, Crack, and Undersealing Materials"—consists of 122 references, dating from 1912 to 1951, which suggest ways to prevent water, silt, sand, and other materials from infiltrating joints and cracks in concrete pavements. The references are annotated by C. W. Lovell, Jr., of Purdue University.

Bibliography No. 12 is available from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. The price is 45 cents.

Modern Paper Mill On Pile Foundation

Merritt-Chapman & Scott Corp. Building Big Facility for Florida Expansion Program of the St. Regis Paper Co.

• THE St. Regis Paper Co. is adding to its facilities a new paper mill at Eastport, Fla., a few miles northeast of Jacksonville on the Florida east coast. The project is part of the company's expansion program in Florida, which also includes a new installation at the St. Regis "Kraft Center" near Pensacola. A contract for the construction at both locations was awarded to Merritt-Chapman & Scott Corp. of New York City, which also built the original paper mill and multiwall bag plant for St. Regis at Pensacola in 1948. Construction of the Eastport mill got under way early in 1951, and is expected to be completed the latter part of this year at a total estimated cost of $17,638,000.

The site for the new mill is well located in relation to the company's wood resources in the Suwanee Forest in Georgia. The property consists of a 170-acre tract along Eastport Road, Florida, Route 105, just off U. S. 17. It was occupied by a large lumber mill when Jacksonville was in its prime as a lumbering town. That was over a quarter of a century ago, and since then the site has been overgrown with a thick stand of trees which were cleared prior to the start of construction.

Broward River, which empties into the St. Johns River about 18 miles above its mouth at the Atlantic, borders the property on the west, and affords access by water to the site. Spur tracks from the new mill connect to the main lines of both the Atlantic Coast Line Railroad and the Seaboard Air Lines Railway. The spur from the latter railroad, nearly 2 miles long, enters the site from the north and borders the shore line of a creek for part of the distance. This was all new construction. During the last war the A.C.L. had put in a spur close to the site to serve an oil-fuel base that was shut down at the end of hostilities. Under a separate contract to the George D. Auchter Co. of Jacksonville, this spur and trestle over the Broward River was rebuilt, and a line brought in to the plant from the west.

Grading the Site

Grading of the site was done by the Wood Hopkins Contracting Co., Inc., of Jacksonville under a subcontract. As might be expected in Florida, the area is low and flat with the elevation only 6 at some portions of the site. Ground water was encountered at elevation 4.5. About 200,000 cubic yards of borrow material was hauled in from pits ½ mile away to fill in the low spots and level off the site to an elevation averaging from 13 to 14.

The long hauls were handled by rubber-tired equipment which included 4 Tournapulls and 6 Caterpillar DW10's with scrapers. For the shorter hauls, from 6 to 15 crawler-tractor and scraper units of various makes and capacities were employed. For dozer work, and for push loading the dirt-moving equipment, Caterpillar D8's and D7's and International TD-18

(Continued on next page)

C. & E. M. Photo

Grading on the site of the St. Regis Paper Co. mill at Eastport, Fla. An International TD-24 pulls a Heil 16.5-yard scraper.

Modern Paper Mill On Pile Foundation

(Continued from preceding page)

tractors were available. Final shaping of the area was done with a Caterpillar No. 12 and an Adams No. 412 motor grader. Another early operation was enclosing the site with a woven-wire fence.

Some of the concrete foundations from the lumber mill that once occupied the site were still intact. These masonry slabs were removed and broken up into chunks weighing several tons, and used to reinforce the embankment of the spur track coming in to the mill from the north. The large pieces were placed at the toe of slopes, while the sides of the fill in the vicinity of the creek were protected against erosion by concrete revetment slabs.

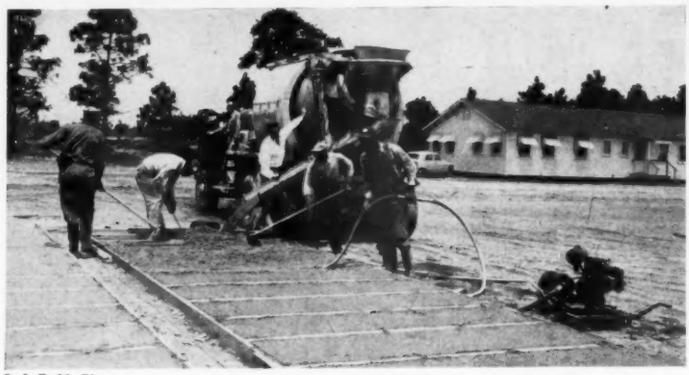
Revetment Slabs

The stretch of embankment requiring such protection was about 1,200 feet long, and the slabs placed on the slope were precast on the job. They measured 8 feet long x 2 feet wide x 3¼ inches thick, with a mat of reinforcing rods through the middle, and weighed approximately 850 pounds. Flat-bed forms made of 2 x 6's were laid out in rows on the ground, with asphalt-felt paper serving as a base. The reinforcing steel served to tie a string of slabs together.

In a typical slab-casting operation, the concrete was delivered to the site by the Ingram Concrete Co. of Jacksonville in a Rex 4½-yard Moto-Mixer mounted on a Mack truck. As the concrete was chuted into the forms it was vibrated with a Mall vibrator, screeded off by hand, and cured with water. One load of concrete usually accounted for 27 sections or slabs. A crane later placed the slabs in position. With this important preliminary work out of the way, the spur track was soon available for hauling in materials.

On Pile Foundation

After a series of exhaustive tests it was decided to construct some of the paper-mill buildings on pile foundations rather than on spread footings because of the rather unstable upper stratum of soil. There are sixteen buildings in the plant, the largest of which is 900 feet long x 100 feet wide where the heavy paper machine will be located. The first two buildings erected,



C. & E. M. Photo

To secure protection against erosion on a stretch of embankment, concrete revetment slabs were precast on the site. A Rex 4½-yard Moto-Mixer on a Mack truck chutes concrete into the forms, then the Mall vibrator at right vibrates it.

while part of the permanent plant set-up, were used by the contractor for shop and storehouse purposes. They are Butler aluminum buildings on concrete-slab foundations. One of them, which will be a machine shop, is 40 x 100 feet, while the other, measuring 40 x 140 feet, is classifield as mill storage.

Pile driving for the foundations of the other buildings was done by Powell Bros., Inc., of Jacksonville under a subcontract. About 3,500 treated-timber piles, averaging 35 feet in length, were driven through a layer of fine sand into a stratum of coarser sand that was encountered at minus 20 elevation. They were driven in clusters of from four to twelve to a bearing of 30 tons, and later capped to form concrete footings.

Driving was done with a McKiernan-Terry S-5 single-acting hammer working in 50-foot stationary leads and handled by a Lorain 820 crane equipped with a 55-foot boom. Compressed air for the hammer was furnished by two compressors hooked up to a receiver—a Chicago Pneumatic 500-cfm and an Ingersoll Rand 315-cfm unit. Working pressure at the hammer was around 95 pounds. In some areas jetting was required, the water being pumped from the river by a Jaeger 4-inch pump into a 2,000-gallon storage tank.

Buildings of Steel and Concrete

The majority of the buildings are

(Concluded on next page)

built of reinforced concrete and structural steel. Transit-mixed concrete was used.

The paper machine that will be installed in the main building was ordered from the Beloit Iron Works of Beloit, Wis. It is 230 inches wide and is designed for an ultimate speed up to 2,500 feet a minute. The entire mill has been designed with devices and equipment to eliminate, or reduce to a minimum, air and stream pollution, and odors.

At the peak of construction some 750 employees were engaged on the new Eastport mill. The new St. Regis projects are under the direction of Myles C. McGough, Vice President of the company's Industrial and Building Construction Division, with A. A. Johnson serving as New York Project Manager for Merritt-Chapman & Scott Corp. W. Hohenhausen is Project Manager at the Eastport site.

C. & E. M. Photo

The first two of the 16 buildings comprising the St. Regis paper mill are Butler aluminum buildings on concrete-slab foundations. Left, machine shop, 100 x 40 feet; right, storage building, 140 x 40 feet.

Wire-Rope Lubricant

An improved lubricant for application to wet wire rope has been developed by The Texas Co., 135 E. 42nd St., New York, N. Y. Texaco Crater A is a thin liquid which is applied without heating. According to the company, it penetrates and adheres to dripping-wet wire rope, remains pliable under a wide range of atmospheric conditions, does not drip or evaporate in hot weather, and does not harden or chip in cold weather. The manufacturer recommends it for use under severe weather conditions, where the wire rope is wet when the lubricant is applied, or where cable is subjected to abnormal water conditions during use.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 556.

Data on Blades and End Bits

A folder on blades and end bits for bulldozers, angle-blade dozers, graders, scrapers, etc., has been prepared by Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland 10, Oreg.

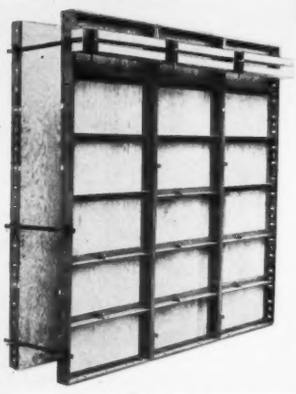
The company states that the use of tough austenitic manganese steel for the blades and wear-resistant alloy steel for the end bits provides an excellent combination for severe work. Stock items are available for all standard makes of earth-moving equipment. Special blade and end-bit designs may also be ordered.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 697.

Asphalt Institute Appoints

Jewell R. Benson is the newly appointed Special Projects Engineer for The Asphalt Institute, New York, N. Y. He will make his headquarters at 1250 Stout St., Denver, Colo., and will be engaged on a national scale in directing and coordinating the Institute's studies with field engineering activities relating to canal, reservoir, and pond linings, dam facings, erosion control, and all other special asphalt uses.

Mr. Benson spent twelve years with the Kansas Highway Department as Research Engineer and then Bituminous Engineer; also four years with the Ninth Service Command, Missouri River Division, U. S. Corps of Engineers, where his activities related to airfield-pavement design and construction. For five years prior to his present appointment he was with the U. S. Bureau of Reclamation at Denver as Bituminous Engineer and Head of the Bituminous Laboratory.



The Atlas Compo form is a completely assembled square-edge unit consisting of a welded steel frame with a plywood face. The design load is 900 pounds per square foot.

Steel Frame Supports Plywood-Panel Forms

Fabricated square-edge forms made of welded steel frame and plywood are manufactured by Irvington Form & Tank Corp., 20 Vesey St., New York 7, N. Y. Designed for 900 pounds per square foot, Atlas Compo forms are supplied with regular exterior-grade or plastic-coated plywood. Panels are fastened to the steel frame with split rivets so the plywood can be reversed and used over again.

Panels come in 12 to 24-inch widths and are 4 to 10 feet high. They are interchangeable and can be used to form most types of concrete construction. Single panels are removed without disturbing the adjoining forms. Although any standard tie accessories can be used with these forms, the company manufactures special flat bar ties, wale clips, and wedges.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 586.

Lightweight Sander

A 7-inch sander is available from Millers Falls Co., Hatch and Taylor Sts., Greenfield, Mass. It weighs 7½ pounds and may be used for sanding, wire brushing, grinding, and polishing on metal, wood, tile, plastic, glass, concrete, and other surfaces.

The Model No. 870 is powered by a Universal ac-dc 25-60-cycle motor. It has a rating of 5.5 amperes at full load on 110-volt current and a no-load speed of 4,500 rpm. It features precision-machined heat-treated alloy-steel gears, pinions, and spindles; grease-sealed ball and needle bearings throughout; and long-life pigtail brushes which are said to be easily accessible for inspection or replacement. It has two handles and a double-pole fully enclosed rocker-type switch for safety and convenience.

The No. 870 sander is supplied with a 7-inch flexible rubber pad, 7-inch semirigid Co-Ro-Lite pad, and three 7-inch assorted cloth-backed sanding disks. Other accessories may also be obtained, including standard cup grinding wheels, wire cup brushes for removing rust, scale, and paint; and the new laminated phenolic wheels and disks.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 696.

Weight of the new 7-inch Millers Falls sander—Model No. 870—is 7½ pounds.

Oil-Burning Equipment

Two new bulletins on oil-burning equipment are available from Hopkins Volcanic Specialties, Inc., P. O. Box 899, Alliance, Ohio. Bulletin 999 describes oil mills for fuel oil, asphalt emulsion, tar and pitch, and acid sludge. Volcanic dryer units are illustrated in Bulletin 1001.

The Hopkins milling process prepares heavy liquid fuels for more efficient and economic operation. The manufacturer claims the mills give bright, clean, hot fires; eliminate tank cleaning; and reduce clogging of valves and burners.

This literature may be obtained from the company, or by using the Request Card at Page 16. Circle No. 700.

How You Can Lower Your Insurance Cost

Take Full Advantage of the Safety-Engineering Service to Which Your Insurance Policy Entitles You

• EVERY contractor wants to keep his insurance costs low. But not every contractor takes full advantage of a man who can help him keep them low: his insurance company's safety engineer.

Often a contractor doesn't know about or doesn't demand the safety-engineering service that is part and parcel of his insurance policy. Just as often, he doesn't use the service that is available or cooperate with the insurance engineer—though such cooperation can mean profit instead of loss on many a job.

For some first-hand information on what insurance engineers can do for contractors, we sought out Donald G. Vaughan, who manages the Engineering and Inspection Department of Aetna Casualty & Surety Co. Mr. Vaughan's first word of advice to contractors was this: start discussing engineering service with your agent when you buy your insurance coverage; find out what kind of service you are buying, then insist on getting it.

Contractors Must Cooperate

To get it, he added, you have to cooperate. That means, first, notifying your insurance company's engineering department when you start a new job so the insurance engineer can get out early to give you his safety recommendations. All too often, Mr. Vaughan said, an insurance company receives its first notice of a new job when a workman lands in the hospital—or the grave.

Second, any safety work must start with top management's active interest, and top management means the contractor himself and his superintendents—not an office clerk with inadequate authority.

Help in Planning Operation

An insurance engineer is on the job only a few hours at each visit, while the hazards on a rapidly moving construction operation change from hour to hour. He cannot, therefore, do the whole safety job for the contractor; but he *can* give advice and suggestions from his study of past accidents. If superintendents will discuss with him the operations that are to be started and conducted before his next visit, he can make recommendations as to types of scaffolds, handrails, toe boards for scaffolds, ladders to the scaffolds, etc.

Mr. Vaughan cited some examples of the help an insurance engineer stands ready to give. A contractor was about to build a 22-story apartment house and would be using material hoists. Knowing that workmen would ride such hoists, in defiance of safety codes, rather than climb ladders 20 stories, the insurance engineer suggested that the contractor provide a passenger hoist with the necessary car and machinery protection. He also suggested a positive communication system on the material hoist to prevent movement of the car in the wrong direction at the wrong time. His suggestion was taken. There were no accidents. And the job superintendent realized a speedup in getting materials to the upper floors. He was so sold on safety helping production that he took the phones and wiring of the communication system with him to the next job.

Another superintendent Mr. Vaughan spoke of worked constantly with the insurance engineer, looking ahead to his next operations and planning safe procedures with the engineer. If planking would be needed for a structural-steel job, they sat down together and planned methods and needs months in advance, while excavation and foundation work was proceeding. Not only was the superintendent entirely safety-minded, but he had an excellent profit rate for his company.

Help in Safety Education

The insurance engineer will also participate and give talks at safety meetings of workmen and foremen, or at the annual safety dinners many contractors are now inaugurating. Often he can furnish motion pictures to be used in educating and interesting employees in accident protection.

One contractor, for instance, had four fatalities in a year. He asked his safety engineer for help. The engineer outlined a safety program, starting with a dinner meeting for all key workers. He gave a safety talk at the meeting and showed a moving picture. But more important, the contractor himself spoke, letting his entire supervisory force know that he was going to demand and get safe operations. After the meeting the contractor followed up on observance of safety regulations, and, with the help of the insurance engineer, operated for the next year with no fatalities and only one serious accident.

Another contractor had some jobs that were good from a safety viewpoint and some that were bad. The insurance engineer suggested that he single out his superintendents with bad safety records—the same ones, incidentally, who were not making money on their jobs—and talk to them privately to win their cooperation. The contractor also instituted a year-end dinner for super-

(Concluded on next page)

How You Can Lower Your Insurance Cost

(Continued from preceding page)

intendents and a prize to the one with the best safety record. A superintendent, who had once bragged to the safety engineer that his job was known as the one with the flying debris, came through with one of the most accident-free records; at present he is in the running for an award as the safest superintendent of the year.

Other Kinds of Help

The insurance engineer, said Mr. Vaughan, can help prevent accidents that injure workmen, spoil work, and damage machinery. He is also alert to possible property damage and public accidents. He gives counsel on the use of sidewalk sheds, screens on buildings to prevent falling materials from injuring pedestrians, guardrails around excavations, adequate lights at night, etc. When blasting or pile driving is contemplated near adjacent property, he will help the contractor survey the nearby buildings to locate existing building cracks, plaster damage, and so forth. Such surveys will many times avoid embarrassing claims later, whether or not the actual damage was caused by the blasting.

Mr. Vaughan was ready with examples of catastrophes or near catastrophes that have struck contractors too busy to take such precautions. In one instance, forms for a concrete floor were not sufficiently shored and the floor collapsed; though no one was injured, the contractor had to spend thousands of dollars to replace the floor. In another case, a contractor was removing the coping from the top of a 30-story building. He had taken some precautions to keep falling materials from reaching the street, but they were not adequate to keep a 6-inch bronze tie pin from getting away. Fortunately it just grazed a man below who was entering a taxi; a few more inches would have meant a fractured skull or a fatality, and a costly liability for the contractor.

The insurance engineer, concluded Mr. Vaughan, is most anxious to discuss all these problems with the contractor and help him lay out safe procedures, safe methods, and a safety-education program for his workers. If the contractor will use this assistance —if he will keep the safety engineer informed about job starts and seek his suggestions *before* different kinds of operations are started—he can save many dollars in losses and prevent many injuries. Moreover, the ultimate cost of his insurance will be considerably reduced.

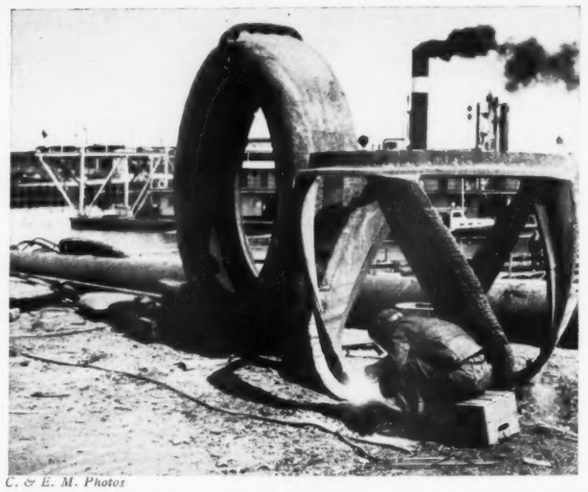
A-C Plans New Factory

Purchase of a 12-acre site in Independence, Mo., was recently completed by the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee, Wis. The company plans immediate construction of a new factory branch to serve more than 125 dealers in eastern Kansas and western Missouri, and to replace the Kansas City branch, in existence since 1931.

The Independence branch at Knowland Road and 35th Street will be a one-story building complete with conveyor systems, loading platforms, and railroad docks ample for handling a large inventory of wheel and crawler tractors, motor graders, power units, etc.

Republic Promotes Dressel

Karl H. Dressel was recently promoted by the Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, Ohio, to be Field Engineer for the company. Mr. Dressel, who will make his headquarters in St. Louis, Mo., has been with Republic since 1950.



C. & E. M. Photos

The cutterhead of the dredge R. A. Brinkman (seen smoking in the background at left) gets a heavy coat of hard-facing—cast-iron rod for flat work and manganese for side and overhead work. A Hobart welder supplies 400-amp current. The Brinkman pumped hydraulic fill for the New Jersey Turnpike and Newark airport.

Heavy-Duty Trailer With Tilting Platform

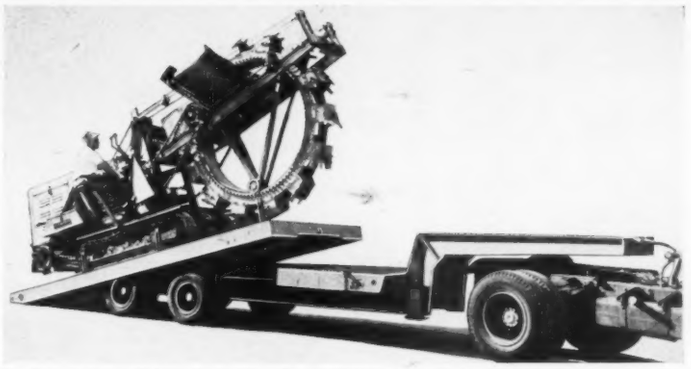
A heavy-duty gooseneck-type trailer with tilting platform is available for transporting heavy machinery with standard fifth-wheel tractors. La Crosse Trailer Corp., Funk Bldg., La Crosse, Wis., makes it and claims it can be loaded or unloaded in 5 minutes by one man, without using skids or blocking.

Made in 14, 18, and 22-ton-capacity units, Model GTTA has a 96-inch-wide platform which tilts into loading position when a simple lock is released at the front of the platform. Two double-acting hydraulic cylinders absorb shock during tilting. After the load is driven or winched into place, the platform locks automatically in horizontal position for hauling.

The trailer is constructed with a one-piece formed gooseneck and subframe. "Walking beams" supporting the axles provide maximum oscillation for equal load distribution over any type of road surface. Constant-rise S cam brakes operated by worm-gear slack adjusters assure braking contact.

The unit carries eight 15-inch tires with extra-wide-base rims, and is available with either air or vacuum brakes. Three lash hooks on each side are included as standard equipment, with the usual lights, reflectors, stake pockets, and other accessories available at extra cost.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 612.



The new 14 to 22-ton-capacity La Crosse GTTA gooseneck-type trailer can be loaded and unloaded in 5 minutes by one man, without skids or blocking.

Lima Personnel Changes

Three appointments were recently announced in the Lima-Hamilton Division of Baldwin-Lima-Hamilton Corp., Lima, Ohio, manufacturer of shovels and cranes. Paul R. Ehrgott is Assistant to the resident Vice President and Sales Manager for shovels of 3-yard capacity and larger.

J. W. Hardesty, formerly a district manager, is now Sales Manager of small shovels and cranes. He is in charge of domestic sales of all shovels and cranes up to and including 2½-yard capacity. Bob Drumm is District Representative for the company in Kentucky, southern Ohio, and West Virginia. Mr. Drumm's headquarters are at 5024 S. Third St., Louisville, Ky.

Literature on Feeders

A 20-page booklet covers the complete line of manganese-steel feeders manufactured by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn. It explains physical details and gives operational data including capacities, horsepower, and dimensions. The Pioneer-Oro feeders are designed and built for handling shock loads of heavy abrasive materials.

The pans and all wearing parts are cast Supermang, a specially developed manganese-steel alloy. Head sprockets are fitted with reversible, renewable bolted-on teeth, and tail sprockets have renewable wear pads. Drive links are cast integrally with pans, and replaceable oval bushings are used in pan links, coupled with nonturning pins. Overlapping corrugated pans with interlocking lugs prevent sag, while cast lugs on the pan ends are said to prevent spillage. The shafts turn in heavy babbitted bearings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 615.

Catalog on Heat Machines

A 6-page bulletin describing a line of heat machines is announced by Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich. Photographs and line sketches illustrate how heated air is sprayed out at floor level to form a blanket of warm air in the working area where most needed. The portable oil-burning units may also be used to heat construction machinery, warehouses, and garages, and to dry concrete.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 553.

Kroeger Goes to Borg-Warner

Fred H. Kroeger has taken over the post of Sales Manager in Charge of Power Brakes and Devices for the Marvel-Schebler Products Division of Borg-Warner Corp., Chicago, Ill. Prior to his present appointment, Mr. Kroeger was a sales executive of the Bendix Division of Bendix Aviation Corp., South Bend, Ind.

Crusher Produces Road Base Course

Limestone Crushing Made Too Many Fines, so Plant Had to Be Equipped With Screens to Remove Fine Material

• A CONTRACTOR who invested in a large modern rock-crushing setup in central Missouri found among his initial customers a competitive contractor. The owner of the new equipment was W. J. Menefee Construction Co. of Sedalia. The contractor customer was Midwest PreCote Co. of Kansas City.

At the time, Midwest PreCote had a 9.7-mile improvement job on U. S. 40 near Robbins, where the plant was set up. Menefee, too, had a contract on U. S. 40 for about 13 miles of relocation and concrete-paving improvement. He bought the plant to turn out crushed limestone for base course and aggregate for hot-mix and concrete. Except for two surge bins, its main units were new. The crushing and screening equipment is all Pioneer, with Caterpillar diesel power.

Menefee purchased right-of-way for his crushed-rock production in a 25-acre tract on Route H, about 7 miles south of U. S. 40. Pasture and 8 feet of topsoil covered a ledge of Burlington limestone from 8 to 12 feet thick.

Scraper Stripping

To open up the property to the best advantage, he had to reroute a small stream to the west side and strip the clay topsoil. A D8 with a LeTourneau Carryall did this work. The Carryall stripped right down to solid rock, and since the formation was flat, it got down to fairly clean material. Minor stripping, where necessary, was done by a bulldozer. The stream was rerouted to a temporary channel, leaving the work area free for equipment.

A Joy-Sullivan 365-cfm air compressor and two Joy-Sullivan wagon drills worked 8 hours a day. Drill holes, made with Timken steel and Timken detachable rock bits, were put down on a 5 x 9-foot grid. Drill speed was good and wear was not bad. Under ordinary conditions, one of the machines sank holes at the rate of about one foot per minute.

The holes were loaded with Du Pont 40 per cent special gelatin, and each hole was equipped with a No. 6 blasting cap in the bottom dynamite cartridge. Approximately 50 holes were fired at one time, using a regular hand battery.

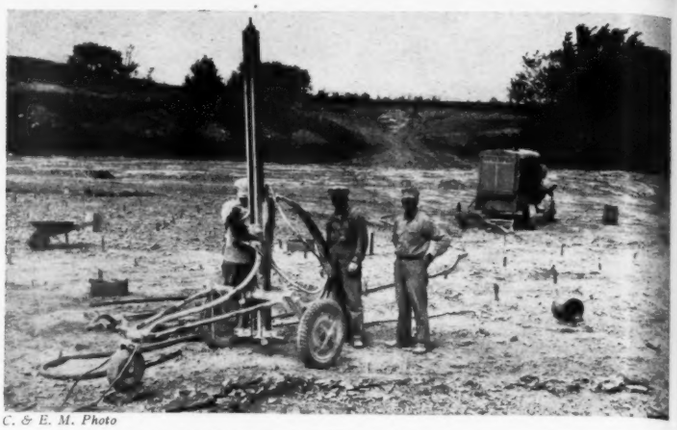
The broken material was reduced to a size fine enough for a Lorain L50 1-yard shovel to load. A fleet of three dump trucks kept it moving to the crushing plant.

A Crushing Problem

Although the limestone passed all required soundness tests, it had a tendency to make excessive fines when it passed through a crusher, particularly when most of the sizes were under ¾ inch. A few other contractors faced with that problem have had to buy and install secondary screening units to get the excess fines out of the stockpile, but Menefee solved it a better and simpler way. On every screen deck in the plant there was a special dust screen, which let excess fines drop through and out into a dump truck to be hauled away.

The raw broken limestone first entered the plant through a 36-foot feeder hopper and a 36-inch feeder conveyor. The feeder took it up an 18-degree incline to a 24 x 36 jaw crusher, which reduced the big chunks down to minus 3½ inches.

Throughs from the jaw crusher passed to a 50-foot 30-inch conveyor, which took the rock to a 4 x 10-foot scalping screen. The screen had a 1⅛-inch scalping deck and a No. 8 dust screen to let excess fines slip through. Material scalped off this screen then passed through a 42-inch triple-roll crusher, which was hooked in closed circuit to reduce the material to a size which would pass the scalping deck. Fines escaping through the bottom dust screen passed out over a short Barber-Greene conveyor to a waiting dump truck, which hauled them away.



C. & E. M. Photo

Drilling powder holes at the Menefee rock-plant site. A Joy-Sullivan 365-cmf air compressor powers a wagon drill which sinks holes at about one foot a minute.

The crushed material then passed up a 75-foot conveyor to a 4 x 10-foot triple-deck sizing and dust screen. Three main sizes of stone were produced: 1-inch-minus, ½-inch-minus,

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C. & E. M. Photos

Chunks of raw rock, (left), pass up the first feeder conveyor to the Pioneer crushing plant (above), that reduced limestone to required size.

and ¼-inch-minus. The three decks on the screen consisted of 9/16, ¼, and ⅛-inch mesh.

As these screens separated the various sizes, throughs passed over conveyor belts to appropriate bins in two double-compartment Pioneer surge bins, which straddled the haul road where dump trucks operated.

The dust-screen scheme worked out successfully, and the amount of fines could be governed precisely by cutting in a dust screen, or routing material around it if necessary. When the plant was visited it was regularly producing 135 tons an hour of 1-inch-minus stone.

Main sources of power on Menefee's plant are Caterpillar diesel engines. A D13000 drives the primary crushing unit, there is a D17000 on the secondary, and a D3400 engine drives the screening mechanism. On this job the crushed material was not washed, since it was solid and clean before crushing started.

A fleet of 15 rented Fords and Chevrolets hauled the crushed rock out to the new highway improvement work. Trucks with crushed rock for Midwest PreCote's widening job dumped the material directly to an Apsco spreader. Other trucks delivered crushed aggregate to the Barber-Greene hot-mix plant near the site, for use in the asphaltic-concrete topping and widening strips.

Menefee's new Pioneer plant, which is one of the most modern portable setups in Missouri at this time, is run in the field by C. S. Rhodes, Plant Superintendent. According to Rhodes, the specifications on crushed material are getting more and more precise, but the flexibility of the new equipment lets him give highway department men the results they ask for with a minimum of plant trouble.

Data on Versatile Scoop

A 4-page folder describes applications of the Duo-Way scoop made by Mixermobile Manufacturers, 8027 N. E. Killingsworth St., Portland 20, Oreg. On-the-job illustrations show the unit leveling and piling material, loading trucks, clearing snow, stacking lumber, and pouring concrete.

The capacity of the lift is 3 tons, and the 1-yard bucket discharges at 8 feet. A crane boom, dozer blade, and swivel concrete hopper are among the other attachments available. The unit is powered by a 114-hp engine, and drives on the open road up to 20 mph. It has 4 speeds in both directions.

This literature may be secured from the company, or use the Request Card at page 16. Circle No. 552.

Atlas Powder Appoints

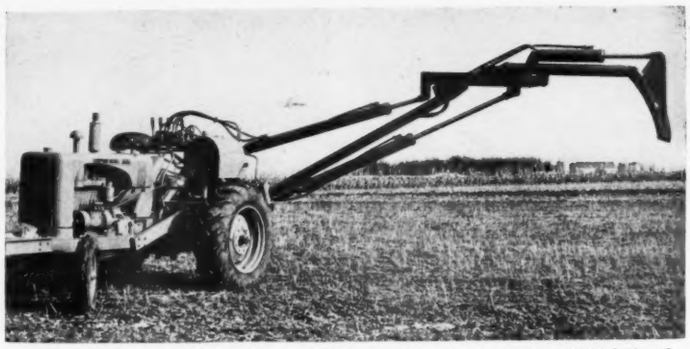
D. J. Carroll Copps is the new General Manager of the Explosives Department of Atlas Powder Co., Wilmington, Del. Mr. Copps, who has been with Atlas for more than 21 years, filled the post of Assistant General Manager of the department since January, 1951.

Other personnel news from Atlas Powder's Explosives Department is as follows: W. G. Frome, Vice President, continues as Administrative Head of the department; William C. Lytle, former Manager of the Explosives Research Division, and Max E. Colson, former Manager of the Atlas explosives plant near Tamaqua, Pa., are named assistants to Mr. Copps; Dr. William Taylor, Jr., formerly Assistant Director of the company's explosives laboratory, succeeds Mr. Lytle as Manager of Explosives Research.

Digger With Rake

A digger with an hydraulically-actuated rake attachment can now be mounted on the Sheppard diesel tractor, announces Badger Machine Co. The Hopto digger can reach 16 feet and dig 9 feet deep within a 180-degree arc. It weighs 6,700 pounds and has a 1-ton capacity.

Further information may be secured from the Badger Machine Co., 1122 W. Fifth St., Winona, Minn. Or use the Request Card at page 16. Circle No. 596.



The Hopto digger, which mounts on a Sheppard diesel tractor, can reach 16 feet and dig 9 feet within a 180-degree arc.

Data on Measuring Device

A folder on a wheel-type device that measures distance as it rolls is available from Rolatape Inc., P. O. Box 1100, Santa Monica, Calif. It illustrates Model 200 which registers up to 100 feet, and Models 400 and 600 which can be wheeled by a car and record distances up to 19 miles. The smaller unit weighs 2¾ pounds and comes with a cowhide carrying case. The long-distance models weigh about 7 pounds and are carried in the rear seat or trunk of a car.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 633.

J. W. Mohler Has NPA Post

J. W. Mohler, Assistant Director of Sales for Caterpillar Tractor Co., Peoria, Ill., is named Deputy Director of the Construction Machinery Division of the National Production Authority. The appointment, which will run for one year, dates from March 15.

During Mr. Mohler's absence from Caterpillar, W. S. Zeigler, Manager of the company's Eastern Sales Division, will take over his duties; Mr. Zeigler's present position will go to J. A. Justeson, now Assistant Manager of the Western Sales Division; and Frank McNamara, a Caterpillar representative on the west coast, will take Mr. Justeson's place.

County Bridge Spans The Mighty Columbia

Design of Newest River Crossing Emphasizes Simplicity and Low Cost; Guy F. Atkinson Co. Is Contractor

• THREE miles upstream from The Dalles, Oreg., where the mighty Columbia River pours down through basalt buttes, Guy F. Atkinson Co. of Portland is building the newest bridge to span the river. In many respects it is an unusual bridge, for of all the man-made structures on the Columbia it is the easiest to build, and it embodies a special design to permit low-cost construction.

It had to be that way. For 60 years or more, men have dreamed of a Columbia River bridge at The Dalles, but up until the last 20 years the economy of the region was never strong enough to make the dream a reality. During the past 20 years most of the delay hinged on whether to support a publicly owned or a privately owned toll bridge. In any case, the circumstances which culminated in the $2,012,256 contract with Wasco County, Oreg., were such that Col. Ralph A. Tudor, noted bridge consulting engineer of San Francisco who is consultant on this project, had to come up with a simple money-saving design.

History

The first attempt to build a bridge at The Dalles was made in 1880 when city voters authorized the creation of a city bridge commission with power to construct such a bridge within 5 miles of the city. The same election authorized the issuance of bonds in the amount of $50,000 to meet the cost of the bridge. However, municipal records do not reveal that any further action was taken.

In 1921 citizens organized a toll-bridge company as a private venture, but again nothing came of the action because of differences of opinion as to bridge location. A city bond issue of $600,000 was voted in 1930, but the Oregon Supreme Court ruled it illegal because it exceeded the bonding authority of the City. A 1933 try for a privately owned toll bridge failed because public sentiment was moving toward publicly owned toll or toll-free bridges.

In 1940 the Oregon Legislature passed a bill authorizing the Highway Commission to construct a toll or toll-free bridge across the Columbia in conjunction with the adjoining state or any political subdivision of it. Accordingly the Commission and the Washington Department of Highways studied the need for such a bridge and reported that one was economically justified near The Dalles.

There were delays. Then World War II intervened. Afterwards, state funds were short. So The Dalles Chamber of Commerce initiated a move to have a competent engineer appraise the economic soundness of a bridge. It chose Ralph A. Tudor and financed the preliminary survey.

On the strength of this report, Wasco County, Oreg., decided to sponsor the construction of a toll bridge which would revert to Oregon and Washington as a free bridge as soon as its cost was liquidated. The County, Oregon, and Washington each contributed $8,000 for the final study by Tudor—which was favorable. The crossing site he recommended was about 3 miles east of the center of The Dalles.

In 1949 the Oregon Legislature empowered Wasco County to construct the bridge, using revenue bonds to finance it, and the Supreme Court of Oregon upheld the validity of the bond issue. This cleared the way for financ-

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C. & E. M. Photo

Simplicity of design and low cost mark the Wasco County bridge across the Columbia at The Dalles, Oreg. The 26 piers, all rectangular, are so much alike that forms can be reused many times. Guy F. Atkinson Co., Portland, Oreg., is the contractor.

County Bridge Spans The Mighty Columbia

(Continued from preceding page)

ing and A. C. Allyn & Co. of Chicago purchased the revenue bonds. However, before financing, the County purchased a privately owned ferry, inadequate for the traffic needs of the day, so that it would not be a competitive factor in the operation and payoff of the bridge. Work on the bridge began in February, 1951.

Economy Achieved

For many years, contractors have urged design engineers to standardize and simplify. The Dalles bridge does exactly that. In the bridge and approaches are 26 piers, all rectangular and so much alike that forms can be reused over and over. The piers are spaced evenly on a symmetrical pattern on each side of the center line. There is a railroad-crossing structure on both sides of the river to carry the new crossing over the railroads which lead up both banks of the Columbia. No pier footings are in the river; it is all dry-land construction.

All told, the bridge with its approaches is to be 2,686.31 feet long from paving notch to paving notch. Designed for H20-S16-44 loading, the bridge proper will incorporate two cantilevered structural-steel trusses, and a suspended truss span. The approaches are to be plain beam and slab construction. Lightweight concrete is to be used on the roadway deck over the entire structure.

No Contractor Problems

There are no contractor problems, a condition unusual in itself. Footings are easy to make. Most of them extend full depth into solid basalt rock common to the region, and the structural excavation is a straight job with compressors, drills, and powder.

All concrete forms are prefabricated in panels. They consist of plywood facing nailed to 2 x 4 studs. Burke and Superior form clamps and ties hold them together, and the panels are reused after a Lorain Moto-Crane strips and moves them.

The concrete-placing scheme is equally simple. On the Oregon side, dry-batched concrete is trucked from a commercial plant and delivered to a Mixermobile, which mixes the ingredients with water. On the Washington side, concrete materials are trucked in and batched by a Johnson plant. The dry batches then go to a Wagner Mixermobile for mixing and placing. All but very high and inaccessible concrete is placed by the Mixermobiles. High pours get a transfer assist from the Moto-Crane.

The job is on schedule, and some time late in 1952 the new river crossing should be complete.

Patching Material

Material for patching and resurfacing floors is produced by Flexrock Co., 3699 Cuthbert St., Philadelphia 4, Pa. Trowel-In is furnished complete with the resurfacer and primer in metal drums and the dryer in waterproof bags. It is applied without heat and can take traffic 18 hours after it is laid. Other applications include making floor expansion joints and insulating concrete slabs from vibration.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 595.

Bulletin on V-Belts

Improved single-groove V-belts are described in a bulletin issued by Raybestos-Manhattan, Inc., Manhattan Rubber Division, 92 Townsend St., Passaic 2, N. J.

Manhattan FHP belts have straight sidewalls for more grip. Cords in the strength member are held in a straight line by a special "truss ply" of finely woven duck under the top cover. This is said to increase the life of the belt and the machine it drives by eliminating vibration. A list of standard sizes of belts is included in the bulletin.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 581.

Literature on Oil Filters

Literature describing its line of oil filters is available from Purolator Products, Inc., 970 New Brunswick Ave., Rahway, N. J. It illustrates and gives capacities and specifications for simple and double-unit filters. Purolator models are produced for diesel, general industrial, and oil-burner-type filtering.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 619.

Austin Co. V. P. News

The Austin Co., Cleveland, Ohio, engineering and building firm, announces the appointment of two new vice presidents, C. W. Wolfe and Karl C. Sippel. Mr. Wolfe joined the company in 1922 and has, since 1938, been Assistant Manager of its Cleveland district; Mr. Sippel has been with Austin since 1924, and since 1941 has been Project Manager of the company's work for The Dow Chemical Co. in Michigan, Illinois, Connecticut, and Canada.

Vice President W. R. Engstrom is returning to Seattle as Vice President and Manager of the Pacific Northwest District. He has been directly in charge of major Austin projects for the Atomic Energy Commission since 1948. Vice President Richard Ellis, formerly Seattle District Manager, will continue as a vice president and consultant of Austin Co. in that district on his return from an extended vacation. Edmund J. Goodheart, who has been serving as Austin's General Superintendent under Mr. Engstrom at the new AEC facility to be operated by The Dow Chemical Co. at Rocky Flats near Denver, Colo., becomes Assistant Project Manager. Mr. Engstrom continues to supervise this work.

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This red, yellow, and black rubber cone for traffic control has a 10½-inch square base.

Square-Base Cones For Traffic Control

A square-base rubber cone for traffic control is produced by Safety Traffic Cones Corp., 949 N. Vignes, Los Angeles 12, Calif. It stands 18 inches high, weighs 2¾ pounds, and rests on a 10½-inch base. Coats of red, yellow, and black paint give it long-range visibility. Luminescent cones are furnished for night work. Like other traffic cones, these give the appearance of steel and can nest in any other cone now produced.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 627.

Centriline Process in West

Pipe Linings, Inc., Los Angeles, Calif., a subsidiary of American Pipe & Construction Co., announces that it is now able to handle the relining of cast-iron and steel pipelines in the western states and British Columbia, using the Centriline process for pipelines of 16 to 144 inches in diameter. Pipe Linings continues to offer its own Tate process for relining pipelines of 4 to 16 inches in diameter. In this territory, Pipe Linings takes over all of the equipment and machinery of the former licensee, the Centriline Division, American Pipe & Construction Co.

Both the Tate and the Centriline processes comprise the removal from the interior of old pipelines of all tuberculation and incrustation and the application of a new cement-mortar lining. In both cases, service suffers only the momentary interruption caused by the installation of temporary by-pass lines.

U. S. Plywood Opens Branch

News of the opening of a sales and distribution unit in California comes to us from United States Plywood Corp., New York, N. Y. The new branch is at 5914 R St., Sacramento, Calif., and occupies a building containing 20,000 square feet of warehouse space. William A. Haskin is Manager.

M. K. Peterson was recently appointed Manager of U. S. Plywood's Boston, Mass., sales and distribution unit.

"I'm all right just as long as I don't look up."

Catalog on Pipe Coupling

The Victaulic coupling and its applications are described and illustrated in a catalog issued by Victaulic Co. of America, P. O. Box 509, Elizabeth, N. J. It gives design data, installing procedures, and specifications of the unit.

The Victaulic coupling fits into pipe grooves at the joint and is secured with two bolts. The design eliminates restriction to flow and makes the joint both flexible and tight. Pipe lengths are easily dismantled, the company points out, making the couplings particularly useful on air and water lines for drilling, jet pumping, and hydraulic stripping or filling.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 590.

Data on Overhead Loaders

Literature describing a line of rocker-type overhead loaders and mucking machines is available from The Eimco Corp., 634 S. Fourth West St., Salt Lake City 10, Utah. The company manufactures six RockerShovel models for both tunnel and above-ground work. The catalogs illustrate on-the-job uses and list complete specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 630.

New 3½-Yard Mixer

A 3½-yard concrete mixer is announced by Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles 31, Calif. As is typical of other Challenge mixers, discharge gate and drum seal have been eliminated on the new model to reduce maintenance problems and permit visible mixing. Discharge can be controlled from inside the cab or from the ground. A Ford engine powers the mixer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 605.

Sales Manager for Waco

Frank X. Mangan is named national Sales Manager for Wilson-Albrecht Co., Inc., Minneapolis, Minn., manufacturer of Waco steel scaffolding, masons' and scaffold jacks, portable elevators, material-hoisting towers, and similar products. Mr. Mangan has been with Wilson-Albrecht since 1946.

A 3½-cubic-yard Challenge concrete mixer joins the line of 3, 4, 5, 6, and 6½-yard models made by Cook Bros. Equipment Co. of Los Angeles.

Improved Truck Line

A complete line of trucks ranging from 4,100 to 16,000 pounds is announced by the Chevrolet Motor Division, General Motors Sales Corp., General Motors Bldg., Detroit 2, Mich. The 1952 model is said to feature more efficient carburetion for smoother performance during the warmup period. Cab-door lock pillars have been redesigned and striker plates repositioned to permit the use of new push-button door locks. An optional outside lock for the left door permits entry to the cab from either side.

The trucks are powered by either of two rugged valve-in-head engines, the 92-hp Thriftmaster or the 105-hp Loadmaster. Chevrolet's 4-way lubrication system and controlled cooling are also continued in the 1952 models. New seat-spring construction, increased visibility, better ventilation, and wide adjustable seats are designed to increase cab comfort.

Synchro-mesh transmissions, braking systems for varied load conditions, and hypoid rear axles are retained in the chassis. Chassis changes cited by the company include better sealing both internally and externally by a thicker air-horn flange and strengthened screw bosses; elimination of possible vapor lock in the main fuel nozzle by redesign of the passage; more consistent hot idling by revisions in the idle system and accelerator pump; smoother acceleration through transfer of the accelerator-pump outlet from the air horn to the top of the float bowl, providing a shorter fuel passage.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 631.

Reports on Bearing Care

Bearing-maintenance problems are discussed in a series of reports available from the Anti-Friction Bearing Distributors Association, 1900 Euclid Ave., Cleveland 15, Ohio. Eight issues of the AFBDA "Bearing Maintenance Report" were published during 1951, and forthcoming copies will be supplied free on request. The reports cover failures, oil seals, leakage, repairs, and similar topics.

This literature on bearing maintenance may be obtained from the company, or by using the Request Card at page 16. Circle No. 635.

Powder-Powered Tool Saves Time, Expense

During the erection of a 6-story defense production plant at The National Cash Register Co., Dayton, Ohio, the contractor saved valuable time by using powder-powered portable tools for a variety of operations. The biggest job they did was anchoring wood sleepers to reinforced-concrete floors. In less than three months, on a 45-hour-week schedule, workmen used a total of nearly 150,000 Velocity-Power cartridge studs to anchor sleepers for about 370,000 square feet of floor surface. Other jobs for the tools included fastening plywood forms for pouring finish concrete, installing electrical junction boxes and conduit, embedding hangers for plumbing and heating lines, and punching holes in ⅜-inch steel angles for brick support sills.

In order to reduce machinery vibration and provide a comfortable and comparatively dust-free footing, each operating floor in the plant was built of 8-inch reinforced concrete, on top of which was anchored 2-inch-thick wood sleepers with a grout fill between them. Nailed to the sleepers was a 1-inch pine subfloor and on top of this a maple hardwood floor. To fasten the sleepers to the floors, the contractor could have drilled holes through them and then into the concrete, set anchor bolts, and tightened the sleepers down. Or he could have driven case-hardened cut nails through the sleepers. He elected, instead, to use Velocity-Power drivers.

Four-man crews installed the sleepers. Each crew consisted of a surveyor, a rodman, and two carpenters. The surveyor and rodman sighted the level while one carpenter installed wedges. As soon as the sleeper was leveled, the other carpenter used the powder-actuated tool to drive a 3-inch stud through the sleeper and wedge and into the concrete, the head of the stud being countersunk in the wood. This technique assured that the sleepers were anchored solidly and on the level because the stud was driven in a single operation.

Sleepers were laid on 18-inch centers lengthwise in the T-shaped building. Studs were driven every 2½ feet but extra studs at each joint raised the average spacing to 2-foot centers. In one week the crews installed a total of 36,936 linear feet of sleepers. Each sleeper was beveled on the edges so the grout would key in firmly. The pine subflooring was laid diagonally on the sleepers and the finish flooring was installed on top.

Another job on the project necessitated the punching of holes in steel angles, which were then bolted to the building framework and served as support sills for the brickwork. For this work the contractor chose a Velocity-Power punch. The angles had to be cut to length and measured against bolt inserts which had been cast in the concrete framework; then holes had to be punched in the exact location of the bolt inserts. By buying standard-length 3½ x 5-inch angle steel, cutting it to length, and punching holes in it at the site, the contractor saved time and outside fabrication costs. The bays took 22-foot lengths with five holes and the columns took 2-foot lengths with two holes.

Left: A 4-man crew levels and installs wood sleepers for a plant floor in Dayton, Ohio. While surveyor and rodman check the level, one carpenter forces wedges under the sleepers, another waits to anchor the sleeper with a Velocity-Power driver. Right: rotate a safety lever, press the tool against the wood, and in one second it drives a 3-inch stud through a 2-inch sleeper into the concrete.

Literature on Truck Hoist

Specifications and uses of a hydraulically operated shop or truck hoist are listed in a folder issued by Unit Mfg. Co., 1229 Harmon Place, Minneapolis 3, Minn. It illustrates how the hoist, mounted on trucks, platforms, machines, and equipment, can lift and load material weighing up to 2,000 pounds. The hoist alone weighs 235 pounds, and with the all-welded tubular steel frame it is 65 inches high.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 564.

Morganza Control Structure

3,750 Concrete Piles, 83 to 118 Feet in Length, Are Cast and Driven in $2,395,570 Foundation Contract

By WILLIAM H. QUIRK
Eastern Editor

• WORK on the Morganza control structure on the Mississippi River shifted into high gear last year with both foundation and superstructure contracts moving steadily ahead. The $20,500,000 structure at Morganza, Point Coupee Parish, La., is scheduled for completion in the spring of 1953. It is designed to control the amount of floodwater diverted from the Mississippi River into the Morganza Floodway and the Atchafalaya Basin, and to limit flow in the Mississippi River below Morganza to the safe capacity of the leveed channel.

The structure is adjacent to the Mississippi River in north-central Louisiana, approximately 25 miles northwest of Baton Rouge. It is at the upper end of guide levees along the Morganza Floodway which is part of the Mississippi River Flood Control Project. A highway and railroad will be carried across the floodway on the control structure. At each end, the structure is connected to the guide levees with earth embankments—9,085 feet long on the north and 9,645 feet long on the south. The initial phases of embankment construction were completed last year. (See C&EMonthly, Oct., 1950, pg. 49.)

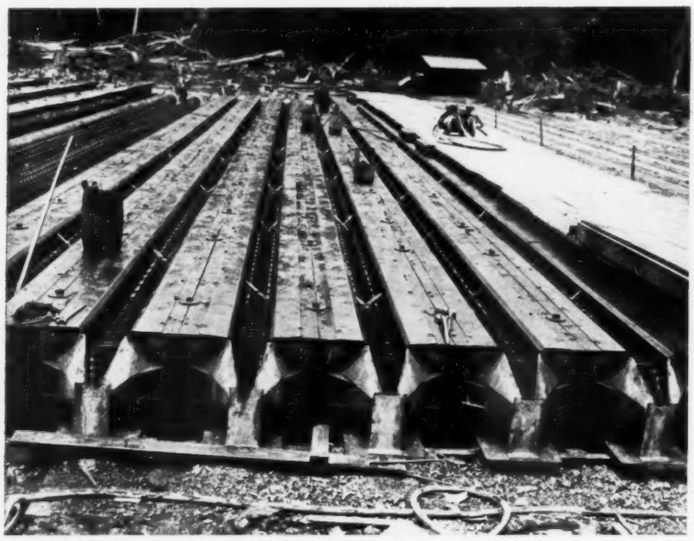
The 3,906-foot reinforced-concrete gated portion of the structure consists of a weir with 125 bays, each having a span of 31 feet 3 inches center to center of piers. It is supported on RC foundation piles driven into a firm sand stratum. The piers form the guides for the steel gates, and support the rails for the gantry cranes that raise and lower the gates. Bridge decks for the

(Continued on page 22)

C. & E. M. Photos

In the Raymond Concrete Pile Co. steel yard, workmen assemble steel cages for pile reinforcing. They push spiral wire on the steel bars. Steel frames hold the cages.

A gantry with a 135-foot span runs the full length of the yard, unloading steel and handling cages and forms. A boiler at the north end supplies steam power.



Here the cages have been placed in pile forms with wood bottoms and special steel sides that serve two adjoining piles; hinges connect the halves at the top.

With its 4-point friction-pickup, the gantry lifts a square-section pile 113 feet long for removal to the storage yard for further curing.

A pile arrives at the structure site by flatcar and is picked up by a Raymond pile driver, an oil-burning rig with 138½-foot leads and an 80-foot boom.

A Vulcan No. 0 hammer drives a batter pile. All pier piles are battered; the only plumb piles are in abutments and training walls at the ends of the structure.

Rises Along Mississippi River

A Byers 83 crane pulls piling driven along the keywall prior to excavation. It uses a pulling pole which has a pair of tongs and a pin for insertion at the pile top.

Farnsworth & Chambers dry-batched superstructure concrete in this plant near the south end of the project. A Koehring crane uses an Erie bucket to charge bins.

A Koehring 34-E Twinbatch paver mixed the concrete. Here an Insley laydown bucket gets a 2-yard load; a Lima 1201 crane with an 85-foot boom handles it.

The bucket is swung over and discharged into forms for the 3½-foot foundation slab. This slab was poured in monoliths 62 feet 6 inches x 59 feet 3 inches.

3,906-Foot Superstructure Contains 125 Gate Bays; It Will Carry Railroad and Highway Across Floodway

• LARGEST of the contracts for the construction at Morganza, La., is the one covering the superstructure for the gated portion of the control structure. This was awarded by the New Orleans District, Corps of Engineers, U. S. Army, to Farnsworth & Chambers Co., Inc., of Houston, Texas, on a low bid of $5,270,000. Construction started in August, 1950, and is expected to be finished by November of this year. The combined $20,500,000 control structure is scheduled to be ready for operation, if necessary, by the spring of 1953.

Built on reinforced-concrete piles (see accompanying article covering substructure contract) and a 3½-foot foundation mat, the RC gated portion is 3,906 feet long x 59 feet 3 inches wide, with a weir designed for a capacity flow of 600,000 cubic feet per second. It includes 125 bays, each having a span of 31 feet 3 inches, center to center of piers. Piers running the width of the slab are 3 feet thick x 32½ feet high, and form the guides for the steel gates, 28 feet 3 inches wide x 30 feet 8 inches high. The gates will be raised and lowered by two gantry cranes, traveling on rails supported on the upstream end of the piers.

Downstream from the crane rails, the piers will support bridge decks carrying Louisiana State Highway 30, and the single-track line of the Texas & Pacific Railway, Port Allen branch, over the floodway. Both these transportation arteries are now carried at grade, upstream of the new control structure. Average ground elevation at the site is about 32; the highway is at 35 and the railroad at 35.5. Headwaters against the structure will be at elevation 56. Top of foundation slab for the structure is at elevation 28; top of piers at 60.46; and the roadway at elevation 63.76. The 29½-foot roadway is a 6½-inch slab carried on 5 RC beams placed 6 feet on centers. Two beams and a slab support the single track, while the gantry is also carried on two beams, one under each rail.

From Upstream Side

Since the pile-driving contractor had established his casting yard midway of the site and downstream of the structure, the contractor for the superstructure laid out his batch plant on the upstream side near the south end. In this way the flow of materials and equipment to the structure by both contractors was maintained with a minimum of interference. Farnsworth & Chambers Co., Inc., set up a plant to dry-batch materials to a paver that mixed concrete directly at the site of the pour.

The plant consists of J. E. Ingram bins—75-yard capacity for the aggregate and 800 barrels for the cement—located on a siding parallel to the T. & P. line. Ideal type 2 cement is shipped in bulk from Mobile, Ala., and transferred from car to bin by conventional worm gear and elevator. Dunham Stevens Co. of Pollock, La., supplies sand and gravel aggregate that is unloaded from gondola cars to stockpiles or directly into the bins by a Koehring 304 crane equipped with a 60-foot boom and an Erie 1-yard barge bucket. Six trucks, holding two batches each, are available for hauling cement and aggregate to the paver.

Water for the mix and general job needs is pumped from a 700-foot well by a Garlet 220-hp electric pump. With the help of a booster the pressure is raised to 250 pounds, and the water pumped through a 2-inch line running the length of the project. The structure requires nearly 7,000 tons of reinforcing steel which is supplied by the Peden Iron & Steel Co. of Houston, Texas. Concrete in the contract totals 120,000 cubic yards. The weights of a typical 1-yard batch of 4,000-pound concrete at 28 days is as follows:

Cement (5½ bags)	517 lbs.
Sand	1,066 lbs.
Gravel (1-inch max.)	1,981 lbs.
Water (31.35 gals.)	260 lbs.
Total	3,824 lbs.

This batch was typical of the foundation-slab pours, for which the contractor used a 5½-bag batch with 5.7 gallons of water to the bag of cement. Darex air-entraining agent was added at the paver to give the mix an air content of 4½ per cent, with a difference of 1½ per cent either way being permitted. Batches were mixed in a Koehring 34-E Twinbatch paver.

Keywall Construction

A rectangular concrete keywall runs the entire length of the 3,906-foot structure on the upstream side; it is 4 feet wide both at top and bottom, and has a depth of 10 feet below the bottom of the foundation slab. A double row of steel sheet piling, 15 feet long, was driven along the sides of the keywall with a McKiernan-Terry 7B hammer handled by a Byers 83 crane equipped with a 35-foot boom. A 110-hp portable boiler furnished the steam for driving. Within the sheet-pile walls the dirt was excavated by the Byers crane outfitted with an Erie ¾-yard clamshell bucket.

After the steel reinforcing was placed for the keywall, the trench was filled with concrete deposited from the boom on the paver working along the upstream side. Two days after a section of keywall had been poured, the steel sheeting was removed. It was easily pulled, piece by piece, with the Byers rig and a pulling pole consisting of a 24-foot length of 12-inch I-beam backed with a ½-inch stiffener plate. The pole had a double block on top and a triple block on the bottom, from which hung a pair of tongs with a 1½-inch pin for inserting in the hole at the top of the pile.

The keywall was poured in sections 62 feet 6 inches long, corresponding to

(*Continued on page 26*)

Morganza Structure Rises on Mississippi

(*Continued from page 20*)

highway and railroad are on top of the piers, immediately downstream from the crane rails. (See accompanying article on page 21 covering superstructure contract.)

On Concrete Piles

Construction of the Morganza control structure is under the direction of the New Orleans District, Corps of Engineers, U. S. Army, which awarded a contract for the pile foundation to the Raymond Concrete Pile Co. of New York City on a low bid of $2,395,570. Work got under way in May, 1950, and was completed by September, 1951.

The job included casting and driving 3,750 reinforced-concrete piles, from 83 to 118 feet in length, with the average around 100 feet long. The cross section of piles up to and including 100 feet is a 20-inch-diameter octagon. In lengths over 100 feet, 20-inch-square piles were used for easier handling.

Piles are reinforced with eight longitudinal bars, 1⅛ inch square, around which are wrapped ⅜-inch spirals. The spiral reinforcing is on a 6-inch pitch for the length of the piles, except at the head and tip where the pitch reduces to 2 inches. The 20-inch piles reduce at the nose to a rather blunt 10-inch tip.

Casting Yard

First step by the contractor was clearing a site immediately downstream from the center of the structure for the pile-casting yard. It extended over 1,000 feet from the structure and was more than 200 feet wide. Along the south side of the yard a spur track was laid connecting to the existing branch line of the Texas & Pacific Railway that crosses the floodway. This railroad line will eventually be shifted about 200 feet west from its present low-level grade to the top of the control structure. Materials for the pile-casting operations were delivered to the yard over this spur track.

Reinforcing steel came from two sources—Tennessee Coal & Iron Co. at Birmingham, Ala., and Sheffield Steel Co. of Houston, Texas. The spur track curved around to terminate at the far end of the yard where the incoming steel was unloaded and stored. A gantry crane with a 135-foot span ran the full length of the yard, unloading steel, handling the assembled steel cages and steel forms, and shifting the completed piles. The gantry had a double-truss steel framework, and was operated by steam power from an oil-burning boiler set up on the north end of the rig.

As a foundation for the casting yard, which is located along the rather soft river plain, 2 x 4's were driven by air hammer about 4 feet into the ground, on 1½-foot centers both ways, and were joined at the top with 2 x 4 runners. The various divisions of the yard included, from the lower to the upper end, incoming-steel storage; steel bending and cutting; butt welding; cage fabrication and storage; pile casting; and pile storage. The longest section, 550 feet, or more than half the length of the yard, was given over to the actual casting of the piles. It could accommodate 200 "bottoms" or base forms for the piles. The next-longest section, 190 feet for pile storage, held 205 piles stacked two deep.

Steel Forms

Steel reinforcing bars for the full length of these piles were difficult to obtain. Consequently, available short lengths were butt-welded together to form the long bars required. Butt-welding was done with a Thomson flash welder, set up on a track below the level of the racks in the steel yard.

C. & E. M. Photo

At the pile-casting yard, a Georgia buggy dumps a load of concrete to steel forms. The Jackson vibrator at left will go into action next.

Thus the work was facilitated by moving the machine from joint to joint as each weld was made. Since the welder required 500-amp single-phase power, a Westinghouse generator was also installed to augment the line current to the yard. Transformers had been set up at the job site to step down the 33,000-volt current supplied to the project by the Gulf Public Service from its transmission line near Morganza. From the job substation, triple-phase lines of 220 and 110 volts were run out to various locations needing light and power.

Reinforcing cages were fabricated from the long bars and spiral wire, steel frames being used to support the heavy assemblies. The gantry moved the steel and the finished cages up the yard to the casting area. The cages were placed in forms having wooden bottoms and steel sides. The "bottoms" or base forms were permanently set, while the sides were shifted after each pour.

These steel side forms were specially designed and constructed for the job by the Concrete Forms Corp. of New York City using ⅛-inch stock. Forms were made up in 10-foot sections and were bolted together to any desired

(*Continued on next page*)

length of pile. Enough sections were available to lay out, at one time, forms for 28 of the longest piles. One form section served as the sides for two adjoining piles, with the two half portions held together at the top by a hinged connection. They were locked in place with special "dogs", or levers. After a pour the forms were easily removed by lifting up on the levers, permitting the sides to spring in together. Forms were usually removed the day following a pour. A timber bulkhead at the butt of the pile served both as a form and as a cushion block in driving. The forms, of course, were used over and over until all the piles were cast.

Concrete Plant

A concrete plant was set up midway of the casting area on the south side where the track served the yard. A stiffleg derrick was first erected on a timber bent with concrete cap. The derrick was equipped with an 85-foot boom actuated by an electric-powered American 3-drum hoist. From its elevated position the derrick assembled the plant, which consisted of a Heltzel 3-compartment aggregate bin and a Heltzel 1,000-barrel cement bin. A Smith 2-yard tilt-type mixer was placed on a platform beneath the bins.

Air-entrained bulk cement was shipped by rail directly to the plant from the Lone Star mill in New Orleans. Sand and gravel aggregate was supplied both by Jahncke Service, Inc., and the Halloway Sand & Gravel Co. from supply sources near Baton Rouge. The material came by rail and was stockpiled at the plant. The stiffleg derrick charged the bins, using a Blaw-Knox 2-yard clamshell bucket. A deficiency of fines in the aggregate was compensated for by adding limestone dust. Deep wells supplied mixing water to the plant, and also water for curing the piles.

Aggregate in the concrete consists of 65 per cent coarse, graded from 1-inch down, and 35 per cent fine material. The 6½-bag batches contained 5 gallons of water per bag, and the concrete had a minimum strength of 4,000 psi at 14 days. From the mixer drum the concrete was discharged into a hopper bin with two outlets at the bottom for filling rubber-tired Georgia buggies that conveyed the concrete to the forms. They were pushed over a wooden runway that ran from the concrete plant along the side of the casting area, with other transverse runways laid out across the tops of the steel forms. As the concrete was placed, it was vibrated with Jackson vibrators.

The dry weights of a typical batch of concrete used in the pile casting were as follows:

Cement	1,222 lbs.
Sand	2,008 lbs.
Gravel	3,908 lbs.
Limestone dust	40 lbs.
Water	531 lbs.
	7,709 lbs.

Pile Handling

A 2-inch water line ran the length of the yard with takeoff valves spaced on 20-foot centers. From this feeder line a 1-inch pipe, equipped with spray nozzles 10 feet apart, was laid out over the top of every fourth pile. If the concrete attained a strength of 3,000 psi after ten days of water curing, the piles were moved from the casting area to the storage section, where the curing process was continued for the full 14 days. This procedure afforded additional space for the actual casting of piles.

For moving the heavy piles, the lifting or carrying beam on the gantry crane was equipped with four friction pickups or tongs having oak pads at the area of contact. The gantry loaded the piles onto railroad flatcars which were pulled by a Plymouth 14-ton diesel locomotive. Four flatcars were on the job, and they were coupled in pairs with a pivot connection to accommodate the long piles. Another Plymouth 12-ton diesel locomotive was on the project for shifting about the various carloads of material.

The service track ran along the downstream side of the structure, permitting the pile drivers to pick up the piles from the cars and slip them into the leads. Driving was done with two Raymond rigs, considered to be among the largest land drivers in the country. They are oil-burning steam machines with 138½-foot steel leads, 80-foot booms, and Vulcan No. 0 modified hammers developing a 32,500-foot-pound blow in their single-action stroke. Boilers are rated at 70 hp. The drivers are supported and move on a combination of timber cribbing and H-beam skids; they can revolve through 360 degrees.

Driving

The longest piles—118 feet—were easily handled in the big leads which were equipped with five guide arms, 16 feet apart, that helped to hold the weight of the pile in the leads. The arms or yokes were made of steel, and had steel friction pads where contact was made with the piles. With these rigs the leads could be boomed out at both the top and the bottom to satisfy any desired batter.

Piles were driven into a stratum of firm load-bearing sand that underlies a layer of clay 65 to 85 feet thick. A penetration of at least 5 feet was obtained in the sand, determined when 67 blows were required to drive one foot. Driving was continued in this hard-packed sand until 175 blows per foot, or until a resistance rate of 305 blows per foot, was reached, after which it was discontinued. The bearing obtained with the piles was considerably above the 80 tons required in the design. No jetting was permitted.

At three areas of the job a layer of sand was encountered at an elevation above that of the desired bearing sand. This condition was revealed by the borings, and in such cases the piles were always driven through the top layer of sand into the lower stratum. In this overdriving, as it was called, the piles were given a minimum of 495 blows to the foot, in order to penetrate this upper sand stratum, before driving was halted.

From the Center

Both rigs started at the center of the control structure and worked toward the ends, thereby insuring the greatest possible consolidation in the embankments at the two abutments. The embankment contractor, Grenada Dam Constructors, Inc., thus had the maximum time for preloading the dirt fills at the approaches to the gated structure. Such preloading is expected to reduce or eliminate future maintenance of the fills because of settlement. Embankments average 31 to 32 feet high, with a crown width of 75 feet to accommodate the railroad and highway, and a base width of from 450 to 500 feet. Dirtwork on the job was fin-

(Concluded on next page)

Morganza Structure Rises on Mississippi

(Continued from preceding page)

ished in the late summer.

Each of the piers for the 125 bays is supported on 27 piles, laid out in three rows on 3-foot 6-inch centers. Average spacing of the piles in the rows is 6 feet 6 inches on centers. All the pier piles are battered, the only plumb piles being at the abutments and in the training walls at the ends of the structure. The center row of each pier, containing 11 piles, was driven with the batter inclined upstream. The two outer rows, each containing 8 piles, are battered in the opposite direction, or downstream. All batters are two vertical to one horizontal.

The usual driving procedure was to start at the downstream end of the center row and work to the upstream end, always moving away from the previously driven pile. This resulted in minimum tightening up of the ground being driven in, and permitted expansion in the subsoil. The outer rows were driven next, one at a time, driving from the upstream to the downstream ends. Piles were driven to their required penetration and then cut off or built up to an elevation of 25.5, and enough concrete was removed from the butt end with air hammers to leave the steel reinforcing exposed for 2½ feet. This steel was later incorporated into the superstructure concrete.

Quantities and Personnel

Pile casting was completed June 28 and the driving was finished before the November, 1951, completion date. With good weather, as many as 150 piles were driven in a single week by a crew of 125 to 150 men working one 8-hour shift.

Major items in this pile-foundation contract included:

Excavation	100,000 cu. yds.
Embankment	90,000 cu. yds.
Cement	45,600 bbls.
Vertical piles	9,350 lin. ft.
Battered piles	320,500 lin. ft.

Raymond Concrete Pile Co. at the start of the job was represented by Superintendent Harry B. Lutz, and later by Superintendent Bill Healey. M. R. Chapman was Field Engineer.

For the Corps of Engineers, U. S. Army, John Harris is Resident Engineer, and Alton Kent, Assistant Resident Engineer, under the supervision of Martin G. Chitty, Field Assistant to the District Engineer for the Baton Rouge territory. The New Orleans District is headed by Col. Charles G. Holle, District Engineer.

Maass for Adams Export

George H. Maass is named Export Manager for J. D. Adams Mfg. Co., Indianapolis, Ind., manufacturer of motor graders and loaders. Mr. Maass has been with Adams since 1937, and in his new capacity he will be in charge of all sales outside the United States except in Canada, which is served by the company's Paris, Ontario, subsidiary, J. D. Adams, Ltd.

Brunner & Lay has added tungsten-carbide bits to its line, in all standard sizes from 1¼ to 4 inches.

Tungsten-Carbide Bit

A line of tungsten-carbide bits is now offered by Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. The Rok-Bits are made in all standard sizes from 1¼ to 4 inches in both the four-point cross and two-point chisel type.

Internal threading is said to reduce wear and damage. The shoulders are formed to maintain alignment and transmit impact directly to the drill steel, eliminating strain on the threads.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 638.

Data on Discharge Valve

A 16-page bulletin features the Howell-Bunger free-discharge valve for high and low heads. It contains a cutaway view, numerous illustrations of the valve in action, detailed specifications, and shop views. The valve is used to pass controlled amounts of water downstream for power requirements, flood control, or irrigation—or to drain a reservoir or pond. It can also be used as a turbine bypass valve or to aerate water. When it is set to discharge into atmosphere, the issuing jet breaks up the water into a fine spray which helps to prevent potholes in the bed of a stream.

This literature may be obtained from the S. Morgan Smith Co., York, Pa., by requesting Bulletin No. 156, or by using the Request Card at page 16. Circle No. 606.

Yours for the Asking

Further information or descriptive literature can be secured from any advertisers in this issue of CONTRACTORS AND ENGINEERS MONTHLY. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

CONTRACTORS AND ENGINEERS MONTHLY

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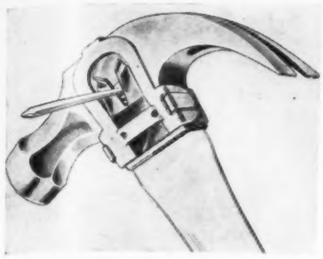


The Third Hand nail clip slips over the head of most hammers and is fastened by pushing two ears through slots, bending and flattening them.

Hammer Nail Clip Frees the Left Hand

A nail clip device which permits a carpenter to start a nail without holding it is manufactured by Amsco Co., LeCenter, Minn. The Third Hand has a clip on each side which will handle any nail from a shingle nail to a spike.

During formwork, roof framing, and other operations, it permits a carpenter to support his work with one hand until at least one nail is driven. Longer reach is also possible with the new clip.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 597.

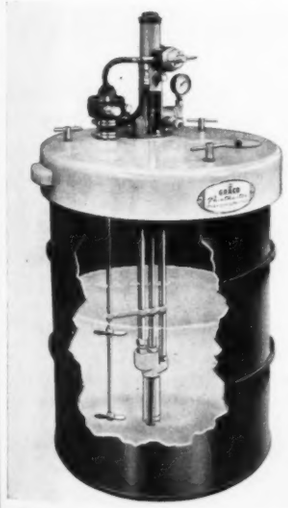
High-Volume Painting With New Supply Pump

A heavy-duty spray-gun supply pump has been announced by The Gray Co., Inc., 1010 Sibley St., Minneapolis 13, Minn. The air-operated double-action reciprocating Paintmaster is specially designed for high volume and pressure so that it can supply long-line circulating systems and multiple spray guns.

The circulating system delivers paint directly to the spray head and back through the supply lines. Since no air pressure is exerted on the paint itself, aeration is reduced to a minimum, thereby eliminating bubbles and pinholes in the finished surface.

The dual-blade air-operated rotary agitator has twin blades adjustable to any depth. A micrometer-type adjustment provides a full range of agitating speeds independent of paint-pump operation which keeps paint thoroughly mixed and maintains uniform viscosity at all times, the company explains.

The heavy-gage steel cover fits all full-size open-top drums. It holds the pump in place and can be adjusted by three hand screws. The manufacturer points out that explosion hazards due to excessive air pressures are removed because no pressure vessel is used. In addition, since floors are free of containers for transferring paint, working conditions are safer and job housekeeping is simplified.



The Graco Paintmaster spray-gun supply pump is designed for high volume and pressure so that it can pump paint through long-line circulating systems and to multiple spray guns.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 620.

Handbook on Wood Treating

A completely revised reference handbook covering wood preservatives and treatments is available from the American Wood Preservers' Association, 839 17th St. N. W., Washington 6, D. C. The "Manual of Recommended Practice" contains all the current standards of the Association relating to preservatives, treatment of commodities, and methods of protecting wood against fungi, insects, marine borers, and other destructive agencies. Conversion factors and correction tables are also included. The 150-page book is in loose-leaf style with a black ring binder.

This literature may be secured from the company, or use the Request Card at page 16. Circle No. 559.

Blaw-Knox Executives

Chester H. Lehman, associated for 42 years with the Blaw-Knox Co., Pittsburgh, Pa., has announced his retirement as Executive Vice President of the company. He continues as Vice Chairman of the Board.

D. V. Sherlock, recently retired Vice President, has been recalled to the firm to assume the position of Acting Manager of the Blaw-Knox Division at Blawnox, Pa. Mr. Sherlock succeeds L. E. Joseph, who has resigned.

Floodway Structure Has 125 Gate Bays

(*Continued from page 21*)

the length of a monolith. There are 63 monoliths in the structure, with each keywall section requiring 69 yards of concrete. A monolith slab contains 493 yards, while the same length of weir has 308 yards of concrete.

Foundation Slab

As the keywall took shape, the contractor excavated down to grade between the rows of battered concrete bearing piles at the piers. A Koehring 605 dragline with a 90-foot boom and a Hendrix 2-yard bucket removed the dirt to the desired elevation. Then the area was backfilled with a 12-inch layer of filter sand in which was laid a drainage system of perforated clay pipe that is continued up through the foundation slab and into the piers. An outfall for this pipe layout is provided in the downstream face of each pier.

C. & E. M. Photo

Personnel on the Morganza Control Structure contracts; left to right, Resident Engineer John Harris, Farnsworth & Chambers Superintendent Elmer Joiner, Raymond Superintendent Bill Healey, and Assistant Resident Engineer Alton Kent.

Each bay also has a relief well extending down into the silty subsoil. The wells and drainage through the sand filter will relieve any uplift that might develop from having a head of water against the structure.

A thin layer of plain concrete, 1½ inches thick, was then laid over this filter material to provide a dry bottom for placing the heavy reinforcing in the foundation mat. At first this working mat was poured with a width of 59 feet, which included the full pier dimension, but it was later extended downstream to take in the stilling-basin area.

Forms for the 3½-foot foundation slab were built of 2-inch lumber with 2 x 6 vertical studs on 15-inch centers. A foot of concrete bearing piles and 2½ feet of exposed steel are embedded in the slab. After the concrete was mixed in the Koehring paver it was emptied out into an Insley 2-yard lay-down bucket, which was handled by a Lima 1201 crane with an 85-foot boom. The slab was poured in complete monoliths, 62 feet 6 inches x 59 feet 3 inches; about 9 hours were required to place the approximately 500 yards of concrete. Water was used for curing.

As the work progressed on the foundation slab, concrete pours followed on the piers, the weir, and stilling basin. Piers were built in two lifts, while the weir and stilling-basin pours were done separately. The stilling basin extends 46 feet 9 inches beyond the downstream edge of the foundation slab. For the piers and weir, Blaw-Knox steel forms were used, with 2 x 10 tongue-and-groove lagging for the lining. For vertical studs there were 8-inch channels on 15-inch centers, and each panel had three sets of 8-inch channels for wales spaced 6½ feet apart.

For the deck of the superstructure the contractor planned to use Blaw-Knox pan forms made from 3/16-inch stock and supported by 6-inch I-beams. All concrete was to be placed from the upstream side, with the boom on the Lima rig increased to 140 feet in order to reach all parts of the work. Concrete is vibrated with Homelite-powered vibrators.

Quantities and Personnel

The Corps of Engineers will furnish the gate leaves and also the gantry to be used in lifting the gates. When the

(*Concluded on next page*)

structure is completed, the Mississippi River levee will be de-graded permitting the water to flow in against the upstream side of the long structure. At present the Mississippi is about 6 miles from the north end of the project, but only a mile from the south end near Morganza.

Major items in the superstructure contract include the following:

Excavation	29,000 cu. yds.
Fill	24,000 cu. yds.
Concrete	120,000 cu. yds.
Portland cement	171,000 bbls.
Steel reinforcing	6,980 tons
Structural steel	647 tons

Farnsworth & Chambers Co., Inc., is employing an average force of 90 men on the Morganza Control Structure under the direction of Elmer E. Joiner, Superintendent.

For the Corps of Engineers, U. S. Army, John W. Harris is Resident Engineer, and Alton Kent, Assistant Resident Engineer, under the supervision of Martin G. Chitty, Field Assistant to the District Engineer for the Baton Rouge territory. The New Orleans District is headed by Col. Charles G. Holle, District Engineer.

Data on Circular-Saw Shop

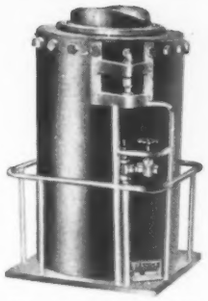
A power tool for keeping circular saws in condition is described in a catalog prepared by Belsaw Machinery Co., 315 Westport Road, Kansas City 2, Mo. It brings each tooth into the cutting circle, grinds out gullets, and bends teeth points for clearance. The unit can be set on any workshop bench, and will handle all circular saws from 4 to 48-inch diameter with center holes ½ inch to 2 inches in diameter.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 602.

New Equipment Jack

An air jack for raising heavy equipment is made by Branick Mfg. Co., Fargo, N. Dak. Air pressure of 160 psi raises it to full height in 20 seconds. A screw-type needle valve holds and releases the air. The jack is 25 inches high, has a 12¼-inch cylinder, and can lift 9 tons up to 44 inches.

Further information on the new Branick jack may be secured from the company. Or use the Request Card at page 16. Circle No. 594.

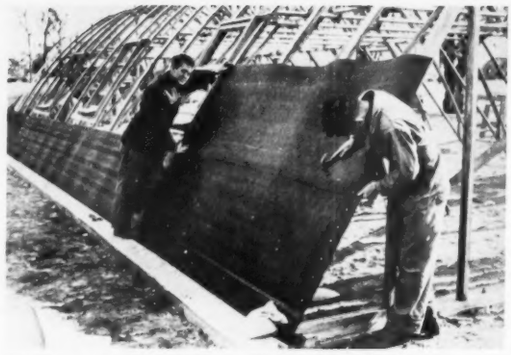


The Branick air jack lifts up to 9 tons on 160 psi.

Temporary Structure Uses Local Materials

An arch-shell hut-type structure which provides temporary housing for personnel or shelter for equipment, is announced by The Patent Scaffolding Co., 3821 12th St., Long Island City 1, N. Y. The reinforced cement-plaster Patscafco Hut is said to be fireproof, vermin-resistant, and practically unaffected by the elements. It can be used in any climate, and is constructed almost entirely of local materials.

The standard 24 x 48-foot unit is 10½ feet high and can be erected by unskilled labor in about 200 man-hours. Seventeen sections of removable, reusable, steel-pipe ribs set on 9 x 18-inch foundations support a bituminous form fabric. Wire mesh is placed over the lapped fabric, which spans the 3-foot distance between the wood nailing strips on the ribs. After two coats of cement plaster are added, the 1½-inch-thick shell sags between ribs creating a rigid corrugated surface. The pipe supports are removed after two days and doors and windows can then be hung.



With the help of a Tube Lox rolling scaffold, form fabric for a Patscafco Hut is quickly put on and nailed to wooden strips bolted to steel pipe ribs. Pipe supports are removed later.

The completed hut is weatherproof and vermin-resistant. Tw coats of cement plaster over bituminous paper reinforced wit wire mesh give the shell a uniform thickness of 1½ inches.

The structure's chief feature is its almost complete independence of manufactured materials. The only shipped items required are the removable rib forms, form fabric, and wire mesh. Local materials needed consist of 14 cubic yards of sand, 5 cubic yards of gravel, 100 bags of cement, and 85 board feet of nailing strips.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 618.

Lawrence Is Explosives Mgr.

Hercules Powder Co., Wilmington, Del., announces the appointment of Dr. R. W. Lawrence as Manager of Explosives Development. He succeeds C. H. Cordie, who retired recently. Dr. Lawrence, who joined Hercules in 1929 and from July of last year was Assistant Manager of Explosives Development, is a leading authority on geophysical prospecting and has been prominent in explosives research for more than 15 years.

Catalog on Sprockets

A 12-page catalog giving sizes and specifications for a line of cast-steel and carbon-steel sprockets is issued by Farrell-Cheek Steel Co., Sandusky, Ohio. Tables list chain numbers, teeth, pitch diameter, and outside diameter for each type.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 591.

Allis-Chalmers Ups Faulkner

Henry M. Faulkner, formerly District Manager in the Eastern Territory of Allis-Chalmers Mfg. Co., has recently taken over the post of Southwest Industrial Territory Manager. Mr. Faulkner, who has been associated with Allis-Chalmers since 1939, will make his headquarters at the company's home office in Milwaukee.

Chemical Control Of Roadside Weeds

Chemical-Herbicide Expert Tells AASHO Some Ways and Means of Dealing With Roadside Weed Growth

• PLANTS, like people, will always overstep their bounds, and what is to someone an ornamental or crop plant, may well be a weed to someone else. For this reason it is not possible to envisage a Utopian future entirely free from troublesome weeds. This does not mean, however, that nothing can be done about the problem, and the mounting interest in weed control shown by all sections of the community, and especially by highway engineers, is proof of the worthiness of the cause.

These views, together with a detailed survey of the chemical methods now in use for the control of undesirable plants along the nation's roadsides, form the subject of a paper delivered at the 1951 meeting of the American Association of State Highway Officials by Mark B. Weed, of the Grasselli Chemicals Department of E. I. du Pont de Nemours & Co. Following is a summary of Dr. Weed's paper.

Highways the Greatest Challenge

Highways are natural incubators for the introduction of new weed species into a community. Seeds of such pests may be carried long distances by vehicles or pedestrians and deposited along the highways, thus introducing them into a place where they were hitherto unknown. There is only one way to prevent these seeds from migrating into adjacent croplands, and that is by stopping them on the highway. Who is to do this? The highway maintenance engineer must bear the responsibility.

Danger to crops is not the only risk where roadway weeds are concerned. From the safety point of view, tall weeds and brush are a real hazard because they interfere with sight distance around curves and at intersections, and obscure road signs, guardrails, and abutments. Another traffic hazard arises in winter when overgrown vegetation acts as a misplaced snow fence and causes snowdrifts to be deposited on the highway.

Weeds also endanger the community as a whole. Bacterial and fungal diseases are cultured on an overgrown roadway, and insects, rodents, and other pestiferous forms may be nurtured there. Also, an overgrown and littered highway shoulder is a serious fire hazard. A careless cigarette from a passing motorist is enough to set this potential tinderbox alight.

Ways and Means

In order to control weeds, it is not, of course, necessary to eradicate all vegetation along the roadsides, but merely to replace undesirable plants with such selected types as perennial grasses. As regards the control of the undesirables, Dr. Weed cites three methods: (1) biological, (2) mechanical, and (3) chemical.

The biological method consists of introducing insect parasites which are known to feed on specific plants. This method, however, is of use only in the case of a few specific weeds, so it is obviously not the answer to roadside weed control.

The mechanical method consists of mowing. Under ideal level conditions where there are few obstructions, this method is cheap and effective—but uneven shoulders obstructed by guardrails necessitate hand-mowing, which may raise annual maintenance costs to several hundred dollars a mile.

There remains the chemical method, which has increased greatly in popularity during the last decade, though it is by no means new. The first tests of such chemicals as sodium chloride, copper sulfate, etc., for use as weed killers were made before the turn of the century, and the resulting emergence of sodium arsenite as the standard herbicide led to the appearance on the market of such early instances of weed killers as sodium chlorate, borax,

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Chemical Control Of Roadside Weeds

(Continued from preceding page)

carbon disulfide, ammonium sulfate, iron sulfate, sulfuric acid, sodium nitrate, and several potassium salts. But it was the relatively recent discovery of 2,4-D that stimulated the great upsurge now apparent in the research activity of state and Federal investigators and the chemical industry. Not only have new and useful herbicides emerged from this discovery, but a rejuvenated interest in some of the older chemicals indicates that home owners, farmers, and maintenance engineers are becoming more chemical-conscious where weed killing is concerned.

Chemical Agents

Dr. Weed classifies chemical herbicides under three main heads: (1) soil sterilants, (2) contact killers, and (3) systemic or translocated herbicides.

Soil sterilants or devegetation agents are those that render the soil unfit for all plant growth for a year or more They do not necessarily, however, injure bacteria and other low forms of life. Such devegetation methods are of importance to highway departments particularly for use around road signs, posts, culverts, guardrails, and in garage and storage areas. Soil sterilants now on the market include sodium arsenite and other arsenicals, sodium chlorate, borax, and other compounds. Though arsenicals are effective weed killers and remain active in the soil for many years, their extreme toxicity to animals makes their use hazardous along public highways. Though some states have employed sodium chlorate at rates of about 600 pounds an acre, this chemical, used alone, presents a fire hazard, and mixtures of sodium chlorate with borates as a safety measure are finding more widespread use, the mixtures being applied at rates ranging from 500 to 1,300 pounds an acre. Borax has been found effective at rates of 3,000 to 5,000 pounds an acre. Sodium chloride (common table salt) has also found some use, but to be effective it needs an extremely high rate, approaching 5 tons an acre, besides having the disadvantage that it is corrosive to metals. Another soil sterilant, the sodium salt of trichloroacetic acid (TCA), when applied at rates of about 100 pounds an acre, is reported to keep an area free of all grass weeds for at least five months.

Contact herbicides are those that kill only the part of the plant with which they come in contact, so that to get effective control the entire plant must be sprayed. There are several contact herbicides on the market, including the dinitrophenols, the pentachlorophenates, herbicidal oils, cyanates, and sodium chlorate. Annual weeds and perennial herbaceous weeds may be quickly killed with these. Other good contact herbicides are the trichloroacetates (TCA), which kill the root as well as the top of the plant.

Systemic or translocated herbicides are compounds which, when sprayed on the foliage or stem of the plant, will be absorbed and transported through the plant, thereby killing the root as well as the upper part. The most important of this group are 2,4-D and 2,4,5-T. Though entirely safe from a human-health standpoint, these chemicals are unfortunately hazardous for use in areas containing valuable ornamental or crop species. The reason for this is that nearby plants unintentionally sprayed with these powerful chemicals become bent and malformed, if they are not actually killed. Dr. Weed mentioned Ammate (ammonium sulfamate), a du Pont product, as an effective translocated type of killer, as it is not volatile and, if used with care, cannot be drifted in sufficient amount to cause damage to adjacent plants.

When to Use What

Selection of the right procedure for the particular circumstances is the secret of effective control of roadside weeds. Consideration must be given to weed population, topography, available materials, equipment, and labor, and it may well be found that in certain cases it is profitable to mix mechanical with chemical methods. On the whole, however, chemicals are likely to be the most effective method of weed control that highway departments can include in their programs, especially where the vegetation consists largely of woody plants. Mechanical methods are both less effective and more costly, because, though the top growth is removed by brush mower and brush axe, resprouting is inevitable. (As one utility-company superintendent said, "Cut one 6-inch tree and next year you will have six 1-inch sprouts; cut them, and the next year you will have twelve or more sprouts where originally you had one 6-inch tree.") Chemicals, however (provided the right one is chosen), kill or inhibit the roots as well as the top of brush, and thereby largely prevent resprouting.

Three suitable chemicals mentioned by Dr. Weed are 2,4-D, 2,4,5-T, and Ammate. Without detracting from the importance of 2,4-D, he points out that it is not the hoped-for panacea for all weed-control problems. Some of its greatest successes have occurred when ester and amine formulations of it have been used on susceptible brush species such as willow, box elder, alder, birch, sumac, and honeysuckle. It also controls many of the broad-leaved annuals and some of the perennial noxious weeds including field bindweed.

A close relative of 2,4-D—2,4,5-T—controls certain plants more easily than the former, especially many of the most pestiferous woody plants. Some instances are Osage orange, blackberry and raspberry brambles, and mesquite. For foliage sprays of these chemicals a concentration of about 0.3 to 0.5 per cent acid is enough, as higher concentrations not only do not increase effectiveness but sometimes even reduce it. In mixed-brush areas, a spray containing a mixture of 2,4-D and 2,4,5-T gives greater latitude of control.

Water-soluble amine and ester for-

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mulations of 2,4-D and 2,4,5-T are available, usually containing 4 pounds of the 2,4-D or 2,4,5-T acid equivalent per gallon. When the two chemicals are mixed, the formulation generally contains 2 pounds of 2,4-D and 2 pounds of 2,4,5-T a gallon. Though almost equally effective for foliage application, the amines are a little slower-acting, but have the advantage of being relatively nonvolatile and not as hazardous as the ester formulations. The development in recent years of such low-volatile esters as the propylene glycol butyl ether ester has reduced the volatility without altering the effectiveness of the ester-type formulation. The advantage of esters lies in the versatility of their application. They may be applied in water, in oil, or in mixtures of these two carriers. Diesel oil and kerosene are the common oil carriers used.

Dormant-Season Spraying

The recently introduced practice of spraying woody plants during the dormant season has extended the utility of these two compounds, particularly 2,4,5-T. For best results, the basal portion of the stem must be completely drenched from the ground line to a height of 1 to 2 feet with a concentration of 2,4,5-T, applied in diesel or fuel oil, of about 16 pounds per 100 gallons. Even during the growing season these basal sprays have proved useful, but spraying during the dormant period has the advantage of using labor during the normally slack winter season. It also minimizes the spray-drift and volatility hazards that accompany foliage applications, though the use of this technique does not insure against spray-drift injury through careless applications.

General-Purpose Brush Killer

Another good roadside weed killer is Ammate, a general-purpose brush killer which is less selective on most species than either 2,4-D or 2,4,5-T, and, being readily translocated, kills the roots as well as the tops of plants. It does not, however, make the soil unproductive for very long, so other grasses often come into the area and take the place of the weeds as the predominant vegetation. Applied as a foliage spray, Ammate should be used at concentrations of ¾ to 1 pound per gallon of water. For best control of woody plants, all foliage should be thoroughly wet, which usually requires from 300 to 450 gallons of solution an acre. Though the initial cost of Ammate may exceed that of treatment with 2,4-D or 2,4,5-T and may not be less than mechanical cutting, there is a saving in annual cost as retreatment is unnecessary for several years. An additional advantage of Ammate cited by Dr. Weed is its nonvolatility, so that adjacent croplands run very little risk of damage.

Tact and Technique

State highway departments have to use diplomacy when faced with opposition of various kinds. Frequently objection is raised to the practice of killing trees with chemicals and then leaving the dead trees on the right-of-way as monuments of destruction. Dr. Weed suggests that a diplomatic act would be to remove the tree from the right-of-way by mechanical cutting and then treat the cut stump with any of the three chemicals already mentioned to inhibit sprouting.

Dr. Weed concludes his paper with the reminder that, though the chemical herbicides on the market today are adequate for the solution of most problems, state and Federal investigators are still engaged in research for new and better methods. Though we are unlikely to find the ideal agent that will kill all unwanted weeds while sparing the desirable plants, it is already possible to control the weed nuisance both conveniently and inexpensively.

Gypsum Fireproofing Lightens Steel Frame

Light structural steel fireproofed with gypsum products may effect big savings in the building industry this year, according to the Gypsum Association. The Association reports that after three years' research the gypsum industry has found that gypsum lath and lightweight plaster can be used as practical and economical fireproofing for steel frames. Tests by the National Bureau of Standards gave these materials fire-resistance ratings as high as 4 hours.

Architects' analyses of a model 12-story building, it was pointed out, revealed that light steel would cost $14 per square foot less than heavy steel and save 2 tons of steel per 12-story column. The analyses showed that heavy steel frame protected with concrete would cost $45 per square foot of building area. By contrast, a reinforced-concrete frame for the model structure would cost $37 per square foot; and a light-steel frame, fire-protected with gypsum construction, would cost $31 per square foot. The Association says that factors for structural strength, fire endurance, and utility were similar in all three designs.

Further information may be secured from the Gypsum Association, 211 W. Wacker Drive, Chicago, Ill. Or use the card at page 16. Circle No. 576.

Trailmobile Canada Expands

Trailmobile Canada, Ltd., a subsidiary of Trailmobile, Inc., Cincinnati, Ohio, truck-trailer manufacturer, has built a new manufacturing plant designed to treble its production facilities.

Located in Scarborough, Ontario, a suburb of Toronto, the new plant replaces Trailmobile Canada's former manufacturing plant at Windsor, Ontario, and will serve the company's five Canadian factory branches, as well as Trailmobile distributors throughout Canada. The plant covers 33,000 square feet and provides for multiple production lines. Servicing is now separated from manufacturing.

Bituminous Paving Is Laid at Low Cost

Gravel and Emulsified Asphalt are Mixed in Portable Asphalt Mixer; Then End-Dumped, Spread, Rolled, and Sealed

• LIKE many other small cities with limited budgets, Meriden, Conn., was faced last year with the problem of replacing considerable mileage of street pavement at a time when the costs of construction are spiraling upward. Meriden, a leader in the silverware industry, has a population of approximately 45,000, and 41 miles of city streets. Of this street paving, 12 miles are of sheet asphalt which has been in service around 20 years. The rest is bituminous macadam.

The sheet asphalt was put down on the principal heavily traveled streets which had once been paved with wooden blocks. It was laid from 2½ to 4 inches thick on brick, concrete, or waterbound-macadam base courses. These streets average 30 feet in width, but East Main Street has a width of 52 feet between curbs. After two decades of use the surface is well worn and has understandably developed cracks, not too pronounced in some areas, but deep and numerous in others. In places large blocks of sheet asphalt have popped from the pavement during the freezing and thawing cycle in the early spring, resulting in holes and bumps of considerable size.

C. & E. M. Photo

A truck dumps sand-asphalt emulsion mix in low piles along one side of a street in Meriden, Conn. The motor grader in the background then spread and shaped the piles.

Estimates for new sheet-asphalt pavements were obtained from contractors, but the prices were far in excess of what the City could afford. The City, therefore, decided to do the work with its own forces, and sought a bituminous mix that could be laid at low cost, and yet would have a comparatively long life, and would tie up traffic as little as possible during the construction.

Bituminous Mix

A good-quality sand-gravel aggregate was available in a city-owned pit, so after a thorough study it was decided to use this material, mix it with emulsified asphalt, and spread this mat over the sheet asphalt most badly in need of repair. A small portable asphalt mixer was purchased, having a capacity of one ton a minute in its continuous-type pugmill. Several experimental mixes were tried out, and put down as patches in the city streets. The results were carefully noted, and finally one mix that indicated the most promise was selected for the bulk of the work.

A slow-setting emulsified asphalt, SS-1 (Connecticut State Highway Department specifications 36-E) was mixed at the rate of 16 gallons to the ton of aggregate. A typical sample of the material was graded as follows:

Sieve Size	Per Cent Passing
1½-inch	100
1-inch	85
¾-inch	82
½-inch	78
⅜-inch	74
No. 10	68
No. 40	19
No. 80	4
No. 200	2.75

By volume, the amount of bitumen in the mix was 5 to 6 per cent. The temperature of the emulsified asphalt during the mixing was around 100 degrees F. The resultant mix presented a densely graded appearance.

Construction Operations

Mixing was done in the yard adjoining the maintenance shop and garage of the Meriden Department of Public Works. Aggregate from the sand pit had been hauled in and stockpiled. A ½-yard front-end loader on a rubber-tired tractor loaded the material into a ¾-yard hopper at the lower end of a 30-foot conveyor. The upper end of the conveyor spilled the aggregate over a 1½-inch mesh screen on top of a box built up around the receiving hopper of the mixer. The shop-made metal box was 37 inches long x 33 inches wide x 24 inches high, and insured an even flow of aggregate into the mixer.

(Concluded on next page)

The emulsified asphalt was drawn into the mixer from a 3,000-gallon tank truck parked at the side of the machine. With the mix being turned out at the rate of one ton a minute, the tank was unloaded in about 2 hours and 45 minutes. The mix was discharged onto the belt of a mechanical loader, which filled the trucks hauling the material to the street or else stockpiled it for use later. With emulsified asphalt, no consideration had to be given to the wetness of the aggregate, nor was a dryer necessary. Mixing was done at the City's convenience, whenever the stockpiles were getting low.

Meanwhile, the surface of the streets was being prepared for the mix. The pavements were swept clean with either a power broom or by hand, depending on the conditions, and the section under improvement was blocked off to traffic. The surface was then given a tack coat of RS-1 emulsified asphalt, (Connecticut State Highway Department specifications 35-F) applied at the rate of 0.2 gallon to the square yard at approximately 110 degrees F.

Spread by Grader

Four city-owned trucks, hauling 6 to 7 tons of the mix a load, end-dumped the material in low piles along one side of the street. It was at once spread out across the pavement by the blade of a motor grader and shaped to the required thickness. This usually averaged about 4 inches at the center of the street, and feathered out to nothing at the curb. In places, however, as much as 7 inches of material was put down to obtain a smooth surface. In some areas, too, the gutters were extremely deep and had given trouble to motorists in the way of loosened hub caps. These low spots were built up to form part of a normal cross section.

The motor grader used in the spreading was purposely fitted out with worn, smooth tires so that no tread marks would be left in the mix. In this way the grader also functioned to a certain extent as a pneumatic-tire roller. When the mix was spread and shaped, it was immediately compacted by a 10-ton 3-wheel roller that was operated at the highest speed possible. While this was only around 8 miles per hour in high gear, it was found that better results were obtained than in running the roller at the slower speeds in the lower gears. The mix did not appear to spread or push so much under the wheels when the roller was driven at top speed.

After the rolling, the new mat was given a bituminous seal coat consisting of an application of RS-1 emulsified asphalt, 0.25 gallon to the square yard, which was covered with ¼-inch crushed traprock. The aggregate was put on from spreader boxes at the rear of the trucks at the rate of 22 pounds to the square yard. The bitumen was applied at approximately 110 degrees F. The stone was rolled in thoroughly, and later if any excess aggregate seemed to be present it was swept off by the power broom and picked up by the front-end loader.

Seal Coat Alone

On the less heavily traveled streets where the existing sheet-asphalt pavement was not too badly worn, no bituminous mat was spread on, but the surface was given a bituminous treatment similar to the seal coat.

A small crew sufficed in this paving work. It consisted of a superintendent, grader operator, roller man, 3 laborers, 4 truck drivers, and 2 flagmen for directing traffic. When the downtown business streets were being paved, the crew began at 4 in the morning and worked until 8 a. m. Then it shifted operations to some of the side streets and continued until noon to complete the 8-hour day. The heavily traveled streets were thus paved with the minimum interference to traffic. A 5-day week was observed.

On this work the City supplied the aggregate from its own pit, but contracted for the bitumen in the mix, the application of bitumen for the tack and seal coats, and the stone used in the seal. The seal-coat work involved the application, leveling, and rolling of ¼-inch traprock over the bitumen by city forces. The treatment was completed on five central and heavily traveled streets in 1951, including one area with a traffic density of over 23,000 vehicles a day. The City expects to continue this method of paving in 1952.

C. & E. M. Photo

Robert Clark (left), late Meriden Director of Public Works and City Engineer, and Deputy Superintendent of Public Works Fred Radtke.

Low Cost

Costs were kept on the work, including labor, materials, and rental rates for the city-owned equipment that was used. The unit price on the bituminous mat averaged slightly less than 30 cents per square yard, depending upon the thickness of the material that was required. The bitumen and stone-chip seal coat came to about 8 cents a square yard.

The work was under the general supervision of Robert W. Clark, then City Engineer and Director of Public Works of the City of Meriden (Mr. Clark died recently), with Fred Radtke, his Deputy Superintendent, in charge of the operations.

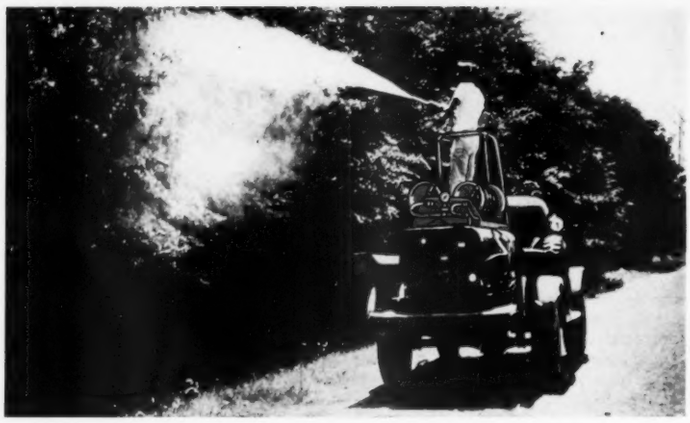
Careful regular maintenance keeps your machines working profitably.

High-Pressure Unit For Brush Spraying

A high-pressure sprayer for weed and brush control is manufactured by John Bean Division, Food Machinery & Chemical Corp., Box 840, Lansing 4, Mich. The Ranger's spray of 20 gpm at pressures up to 700 psi can be adjusted to reach tree tops, penetrate thick brush, or cover large areas.

The pump is completely enclosed and can handle many types of spray materials. It is powered by a 12-hp air-cooled Wisconsin 2-cylinder engine with throttle governor and handy speed control. A V-belt transmits power to the pump and the agitator.

The spray material is strained as it enters the 200-gallon steel tank and is filtered between the tank and the pump. Propeller-type paddles constantly agitate the solution. The tank, with a railing on top, puts the operator in the best position to see the spray area. To meet different spraying conditions, the pressure-control rod is on top of the tank near the operator's hand.



The Ranger's spray of 20 gpm at pressures up to 700 psi can be adjusted to reach tree tops, penetrate thick brush, or cover large areas.

Two 100-foot lengths of high-pressure ½-inch hose permit spot spraying away from the road. The rewind crank, brake, and gun clips are on each rail. The two spray guns can be adjusted to any desired stream, and can be quickly shut off with the trigger-type control.

The sprayer is 92 inches long, 37 inches wide, and 35 inches high. The railing is 34 inches high. The unit's net weight is approximately 1,500 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 575.

Line of Saw Blades

A full line of saw blades has just been placed on the market by Simonds Saw & Steel Co., Fitchburg, Mass. It includes the following types: rip, regular cutoff, flooring cutoff, fine-tooth cutoff, planer (hollow ground combination), carbide-tipped, dado, nonferrous, and friction. Blades up to 12 inches in diameter are furnished with round or special-shape center holes for use on table, radial-arm, or electric hand saw machines. Each saw is individually packaged for extra protection. Operating and sharpening instructions are sent with each package.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 574.

Bulletin on Rock Crushers

A 12-page bulletin on Kue-Ken rock crushers is issued by Straub Mfg. Co., 507 Chestnut St., Oakland, Calif. Sketches show how the unit's action of crushing by pressure compares with other types of crushers in which the rock rubs and wears away crushing surfaces.

In the Kue-Ken, a massive jaw swings on an overhead hinge pin by the action of an eccentric shaft and two toggles at the jaw's base. Its special features include a single flywheel, and a safety device for overloading or tramp iron.

The bulletin gives capacities, power, weights, and similar data for all Kue-Ken models.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 625.

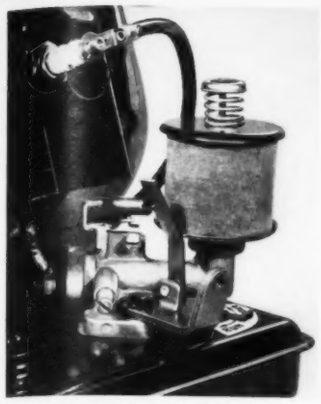
Hewitt-Robins Sales

The establishment of a fourth sales division is announced by Hewitt-Robins Inc., New York, N. Y., manufacturer of conveyor belting, hose, and other rubber products, conveying and vibrating machinery. The new branch is the South Central Sales Division, covering Texas, west Tennessee, Oklahoma, Arkansas, Louisiana, Mississippi, and Alabama. L. C. Holloman is Assistant Division Manager, with headquarters at Houston, Texas.

There is news, too, from Hewitt-Robins' Eastern and Western Sales Divisions. Norman M. Godfrey recently took over the position of Manager of the Eastern Sales Division, comprising the districts of Boston, New York, Philadelphia, Pittsburgh, and Charleston.

G. V. Migula is the newly appointed Manager of the company's Western Sales Division, with headquarters at San Francisco. He succeeds J. H. Hayden, who has retired but continues to serve in an advisory capacity. For several years Migula & Co. has acted as west-coast agent for Hewitt-Robins, which now takes over the assets of the Migula company as well as some of its personnel. Marion D. Austin, who has been with Hewitt-Robins since 1947, joins the Western Sales Division as District Manager of the Hewitt Rubber Division; and K. L. Way, 23 years with Hewitt-Robins, succeeds Mr. Austin as Manager of Hose Sales and Development.

Hewitt-Robins' future plans include the moving of the company's executive offices from 370 Lexington Ave., New York 17, N. Y., to Stamford, Conn. The move is expected to take place about April 1.



An automotive-type air cleaner, a rotary choke control (below it at right), a Boden cable transfer lever, and a new and simplified metering-valve assembly are among the latest improvements in Continental Motors' vertical-shaft air-cooled engines.

Air-Cooled Engines Get New Oil System

A number of improvements have been built into the 1952 vertical-shaft air-cooled engines made by Continental Motors Corp., Industrial Air-Cooled Engine Division, Detroit, Mich. A small-diameter metal tube in the lower crankshaft counterbalance lobe, with its lower end projecting into the oil reservoir in the base, lubricates the connecting rod and the cylinder wall. This tube pierces the lobe at such an angle that when the engine is running, oil is picked up and ejected forcibly at the level of the connecting rod to maintain a lubricating mist.

A rotating screen, held in place by the starter pulley, excludes foreign material from the air-cooling system. At the bottom of the base there is a new metal slinger seal to keep the crankshaft clean.

Also in the base is an oil-level dipstick. A ball-check type of breather with floating cap keeps dirt and water out of the crankcase. Two heavy-duty bearings in the base provide rigid support for the crankshaft, which is of extra-large diameter at the takeoff end, for added stiffness and strength.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 588.

Spring-Action Binder

A load binder with a spring which maintains uniform constant tension is announced by Canton Cast Products Co., 2475 13th St., N. E., Canton 5, Ohio. The company reports that the spring design practically eliminates breakage of chain and hooks. Four models now in production begin with a 9,000-pound capacity.

The spring in this Canton load binder is designed to maintain constant uniform tension and eliminate chain and hook breakage.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 614.

Booklet on Development Of Rock-Drilling Machine

An economic study of the automatic self-contained rock-drilling machine made by Demo & Canon Engineering & Mfg. Co., Inc., has been issued. It reviews the development of the gang drill and compares its estimated operating cost with that of other tunnel-drilling equipment. Analyzing the unit's performance on a typical rock tunneling job, it reports a probable total cost of about $94 per foot.

The unit has a bank of 28 drill rods in a rack-like fixture flexibly connected to the main driving unit. The 15 outside drills may be moved vertically or horizontally. The others are fixed parallel to the direction of drive. The machine can be mounted on a flat-car or suspended from a monorail.

The company and its subcontractors train or furnish operators, service and inspect, and manufacture replacement and repair parts.

This literature may be obtained from the company at 2215 S. Sepulveda Blvd., Los Angeles 64, Calif. Or use the Request Card at page 16. Circle No. 583.

Gurley Elects Higbee

Lester C. Higbee was recently elected President of W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering and surveying instruments. Mr. Higbee, who joined the company in 1915, is the fifth president of the 107-year-old firm. Charles E. Smart, the retiring President, will serve as Chairman of the Board.

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Public Works Contracts: When They Are Invalid

THE PROBLEM: *All courts seem to agree that a contract for work which a public agency is not legally authorized to award is utterly void—for example, if a school district were to undertake construction of a road or if a road district were to attempt to erect a schoolhouse. Where the agency is legally empowered to contract for work, but fails to comply with such statutory requirements as awarding a contract on competitive bidding or exac ng from the contractor a bond to secure faithful performance of the contract, the courts in different states do not agree as to whether the contractor may be prevented from collecting anything for work and materials furnished.*

If the work is beneficial, many courts permit recovery of the reasonable value of work done and accepted by the contracting agency. But in some states the right to collect anything depends upon the nature of the statutory requirement that has been violated. It may make a vital difference whether the agency has disregarded a requirement for letting contracts on competitive bidding or whether there was mere irregularity in calling for bids.

In a specially noteworthy case which the Minnesota Supreme Court was called upon to decide, a township board let a road-building contract but ignored statutory requirements that there be a written contract awarded after competitive bidding and adoption of plans and specifications, and that the contractor be required to give bond. The work was done according to contract and was accepted by the town board. Could the contractor legally collect reasonable pay for the job, within the limit of township funds available for such work?

THE ANSWER: Yes. (Kotschevar v. North Fork Tp., Stearns County, 39 N. W. 2d 107.)

The Supreme Court treated as highly important this fact: the township did not deny that the work done benefited it to the full extent of the contractor's claim. The court recognized that neither good faith nor benefit to the township could validate the contract in such a way as to entitle the contractor to recover the contract price, because essential statutory requirements governing the award of such contracts had been violated. But the court, by a six-to-one vote of its justices, decided that there was an implied obligation on the part of the township to pay something for the benefits secured through building of the roads and acceptance of the same by the township.

The opinion refers to the court's previous decisions where similar questions were raised. A village bridge contract was let without advertising for bids. The bridge was completed, accepted, and paid for. When it was subsequently washed out by a flood, the village unsuccessfully sued to compel the contractor to refund the payment on the ground that the contract was void. (Village of Pillager v. Hewett, 98 Minn. 265, 107 N. W. 815.) In that case, the court observed that the contract price could not have been collected had the village not accepted the bridge and paid for it, but that it would be "most inequitable and unconscionable" under the circumstances to compel the contractor to return the money and bonds received by him.

In State v. Clark (116 Minn. 500, 134 N. W. 129), a town board let a road contract without exacting a bond for faithful performance. Because there was a statute specifying that "the contract shall not be valid for any purpose if the bond is not given and approved", the court decided the contractor could not collect the contract price. It did decide, however, that "on full performance of his work and the acceptance thereof by the town, [he] had a moral and legal claim against the town for the reasonable value of his labor and the materials furnished".

But in the case of Lundin v. Township of Butternut Valley (172 Minn. 259, 214 N. W. 888), the court denied a contractor right to compel payment

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Avoid Legal Pitfalls

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for a bridge that collapsed before it was completed, accepted, or paid for; statutory requirements for plans and specifications and furnishing of a bond had been ignored, and there was "no evidence to prove that the town had received any benefit therefrom".

In Wakely v. County of St. Louis (184 Minn. 613, 240 N. W. 103), a county commissioner, without authority from his board, bought clay and sand used in improving a highway. A majority of the court decided that the seller was entitled to the reasonable value of the materials, measured by the benefit to the county, the purchase having been made in good faith.

As to the amount that the contractor was entitled to collect in the township road case first mentioned in this article, the Minnesota Supreme Court decided that the amount could not exceed that which the township was legally authorized to expend in that particular year for road and bridge purposes. In other words, the amount that a contractor can recover in cases of this kind is not only limited to the reasonable value of the work accepted by the public agency, but is also bound by any statutory limit as to the amount that may be expended for the purposes involved.

One of the seven justices of the Supreme Court dissented from the conclusions reached by the court. In the course of a lengthy opinion, Associate Justice Harry Peterson, former Attorney General of Minnesota, argued vigorously that the court should align itself with a rule generally recognized by most courts throughout the country: that such contracts are void and unenforceable, and there is no implied liability, on the part of the municipality or other public body with which such contract was made, for the reasonable value of services or materials, even though the public has received the benefits of such performance. "These provisions exist to protect citizen taxpayers from unjust, ill-considered, or extortionate contracts, or those showing favoritism; and if the public body is suffered to disregard them and the other party permitted to recover upon an implied contract, such provisions can always be evaded." (43 American Jurisprudence, Public Works and Contracts, sec. 95.)

Material Man Can Collect From Agent or Principal

THE PROBLEM: *B bought materials from plaintiff, who charged them to him, not knowing that B was acting as agent for defendant, who needed the materials for construction jobs he had contracted. The construction contracts had been recorded, but plaintiff did not know that and unsuccessfully tried to collect from B. Could plaintiff then change front and hold defendant liable?*

THE ANSWER: Yes. (Imperial Valley Box Co. v. Reese, 233 Pac. 2d 629, decided by the California District Court of Appeal, Fourth District.)

The court said that the material man had a right to assume that B was either an independent contractor or a subcontractor, having no reason to suppose that B was acting as an agent. That brought the case within the well settled rule of law that where one deals with another whom he believes to be the principal, but subsequently learns to be an agent of an undisclosed principal, he can force payment by either.

Bid Deposit Not Forfeitable

THE PROBLEMS: *Bidding spex provided that a bidder must forfeit his proposal guarantee if he failed to begin execution of a state highway contract within 10 days after the date of the award. But the wording of the proposal in the state highway commission's form was different. It stated that the contract and bond were to be furnished within 10 days after notice of the award of the contract had been received.*

Plaintiff was lowest bidder by $40,000. He subsequently discovered that he had overlooked various cost items and had made a mistake in his bid. He therefore tried, unsuccessfully, to secure return of his $30,000 certified check.

The state engineer said an award would be made on August 5. But it was not until August 8 that plaintiff received a letter saying the award had been made. On August 12 he wired a request for delay. It was refused, and the commission adopted a resolution for forfeiture of the check unless plaintiff returned the signed contract by August 15, or 10 days from the date of award—August 5. The check was forfeited on August 16, and a contract was made with the next lowest bidder.

1. Which took precedence—the bidding spex, which calculated the 10 days from the date of receipt of the notice of the award; or the proposal, which calculated the 10 days from the date of the notice of the award?

2. If the proposal took precedence, did the 10 days run from the date of receipt of written notice, or from an earlier date when plaintiff knew or should have known of the award?

THE ANSWERS: (1) The ten days ran from the date of the receipt of notice of the award. (2) The provision for notice required written notice. (Covington, defendant-appellant, v. Basich Bros. Construction Co., plaintiff-appellee, 233 Pac. 2d 837, decided by the Arizona Supreme Court.) In other words, plaintiff's check was prematurely forfeited and must be returned.

There does not seem to have been any disagreement among the five judges of the Supreme Court on the first point: because the commission worded the bidding spex and the proposals, the conflict in wording should be decided in favor of the bidders, giving them 10 days from notice of the award, not ten days from the award. The rule that the law "abhors forfeitures" was specially applicable.

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Power Crane & Shovel Elects

The Power Crane and Shovel Association, at its annual meeting in Washington last January, elected as its President, C. B. Smythe, President of The Thew Shovel Co., Lorain, Ohio. The Association comprises 16 manufacturers of commercial-sized power cranes and shovels. This classification includes 95 per cent of all power cranes and shovels manufactured and is made up of full-revolving excavators ranging from ⅜ to 2½ cubic yards in capacity or lifting cranes up to 50-ton capacity.

Avoid Legal Pitfalls

(Continued from preceding page)

But the decision on the second point was reached by a narrow vote of three to two. The majority treated the proposal clause for "notice of the award" as meaning such written notice as was received by the plaintiff. But the two other judges dissented. They contended that plaintiff knew or should have known the contract was being awarded to him on August 5—so forfeiture on August 16 was proper.

According to the majority view, which became the opinion of the court, the state commission, without declaring a valid forfeiture of plaintiff's check, in effect revoked the award to plaintiff and by awarding the contract to the next lowest bidder placed plaintiff in the category of an unsuccessful bidder entitled to return of his check.

Failure to Place Barricade; Gravel Pile Caused Accident

THE PROBLEM: *A well traveled track was open to motorists on a road that was being graveled. Plaintiff, riding in a car driven by her husband, was injured when a front wheel struck a pile of gravel nearly 7 feet wide x 2 feet high, which had been dumped and left unspread on the traveled track. The glare of the sun and the sameness of color of the road surface and the gravel may have prevented the driver and plaintiff from discovering the gravel in time to avoid the accident. The road contractor had posted no warning or barricade. In plaintiff's suit for damages, could the jury decide that the contractor was liable?*

THE ANSWER: Yes. (Kuska v. Nichols Construction Co., 48 N. W. 2d 682, decided by the Nebraska Supreme Court.)

The Court ordered a new trial of the suit, which had been dismissed by the trial judge on the ground that there was no evidence that the contractor was at fault. The Supreme Court said that existence of a traveled track in the road, without any barricade or warning sign, constituted a continuing invitation to the public to use the road.

The higher court also noted that in Nebraska, as in many other states, any negligence of plaintiff's husband in failing to discover the gravel pile in time to avoid hitting it could not be charged to plaintiff. However, if she discovered it in time to have warned him, her failure to warn him would prevent her collecting damages.

Federal-Aid Projects— Lowest Bidder's Rights

THE PROBLEM: *The lowest bidder on a hospital project being constructed by a state agency under Federal aid sued to enjoin award of the contract to a competing bidder. Did the unsuccessful bidder have a right to enjoin the United States Surgeon General as a defendant on the ground that the latter, in violation of his own rules, had approved the contract awarded despite the lowest bidder's protest?*

THE ANSWER: No. (Clement Martin, Inc., v. Dick Corp., 97 Fed. Supp. 961, decided by the United States District Court, Western District of Pennsylvania.)

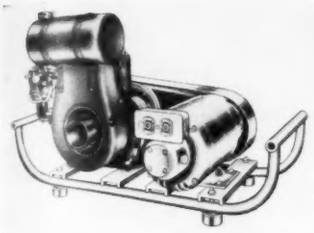
The court pointed out that the Surgeon General was under no contractual relationship to plaintiff and that Federal regulations under which aid was granted to the state agency were adopted "for the benefit of the people and the government and not . . . prospective bidders".

The court also ruled against plaintiff's right to maintain the suit in his capacity as a taxpayer interested in preventing waste of public funds.

Liability for Cable Damage

THE PROBLEMS: (1) *A street contractor damaged underground cables during careful excavation. He did not know of the existence of the cables, and had relied on information from municipal engineers that it was all right to proceed. Was he liable to the public service utility for such damage?* (2) *The county engineer notified the telephone company which had installed the cables in the street that improvement involving excavation was to be made by the county. The engineer did not know that another company had succeeded to ownership of the cables. Was the notice sufficient?*

THE ANSWERS: (1) Yes. (2) Yes. (New Jersey Bell Telephone Co. v. Kramer, 152 Atl. 186, decided by the New Jersey Supreme Court, 1930.)



Wincharger Corp.'s portable gasoline-engine-powered generator comes in three different wattages. It mounts alongside the engine.

Gasoline-Powered Portable Generator

A portable gasoline-engine-powered electric generator is announced by Wincharger Corp., 2110 E. 7th St., Sioux City 2, Iowa. Series 1800 has 1,000, 1,250, and 1,350-watt models at 115 volt 60-cycle ac current. They are equipped with sealed ball bearings, and are mounted alongside the engine for cooler operation. The manufacturer claims that the belted construction cushions shock, reduces vibration, and increases the life of the generator.

Any one of several popular makes of engine may be mounted on the generator base and the unit may be purchased with or without an engine. The generator without the engine mounting is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 566.

Hard-Surfacing Rod

A new hard-surfacing welding rod and a new method of hard-surface overlay for millhammers and like applications are announced by Rankin Mfg. Co., 3072 W. Pico Blvd., Los Angeles 6, Calif. Ranite C-X is the new formula, and proper application of it involves slowing the cooling rate as much as possible and preheating if feasible.

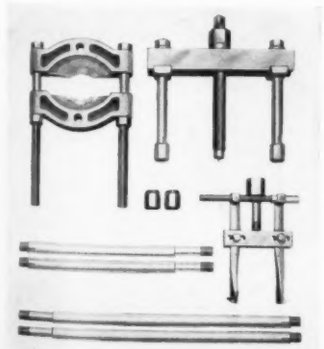
In company tests on millhammers, using Ranite C-X, Ranite No. 4, and tungsten-carbide overlay, Ranite C-X was the equal of the tungsten-carbide tube rod and Ranite No. 4 outperformed it. Rankin claims that either Ranite C-X or Ranite No. 4 will, on some applications, give as much surface protection as the costlier tungsten and afford savings of over 66 per cent, since Ranite rods have lower specific gravities and consequently cover more area per pound.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 636.

Service-Tool Set

A set of service tools for large Caterpillar tractors such as the D8, but especially the DW20 and DW21, has been developed by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn. It provides a wide range of utility tools for most pulling and installing operations which involve gears, bearings, pulleys, shafts, sprockets, bearing outer races, bushings, etc. The company says that No. CT-6 set can do these jobs with a substantial saving of time and without damage to expensive parts.

Further information may be secured from the company by requesting Bulletin CT-50. Or use the Request Card at page 16. Circle No. 657.



This is Owatonna's No. CT-6 set of service tools for large Caterpillar tractors—D8, DW20, and DW21.

Land-Clearing Machine

Land-clearing operations of the Bushwacker are illustrated in a folder issued by American Steel Dredge Co., Inc., P. O. Box 570, Fort Wayne 1, Ind. It describes how the tractor-mounted unit with its hammermill-type disintegrator clears growth up to 6 inches in diameter. The machine operates by reducing all woody fibers to mulch material and depositing it on the cleared ground. The company claims that this clearing technique leaves the topsoil undisturbed and retards erosion.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 600.

Booklet on Rubber Roads

The history and development of rubber-asphalt paving is presented in a booklet issued by the Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C. It discusses research and costs, and describes existing test rubber-asphalt pavements laid in Virginia, Ohio, Texas, Minnesota, and Canada.

Although this type of pavement is now being used in 13 states, only three years have elapsed since the first rubber-asphalt road was laid. Tests in the Netherlands, the Bureau reports, indicate that rubber-asphalt extends pavement life, is less susceptible to temperature variation, less brittle, and reduces the effect of shock.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 609.

Engineering Scholarships

Ceco Steel Products Corp., Chicago, Ill., has established two engineering scholarships at the Illinois Institute of Technology, Chicago. Each scholarship provides $1,000 for the junior and senior years to a student enrolled in the civil engineering or general engineering curriculum. Continuation of the scholarship through the senior year will depend upon the student's record during the junior year.

Beginning in September, the awards will be made to worthy and needy students, and scholarship winners will be offered employment at Ceco's Chicago plant during the summer.

Getting the Full Output From Your Compressor

Full Maintenance Means Full Output—Inspection, Care in Handling, Lubrication, Attention to Hose

• ARE you getting full production these days from your air-powered drills, grinders, riveters, and rammers? Do you know, for instance, that their production can fall off 37 to 41 per cent if air pressure drops from 90 to 70 psi?

Such a pressure drop may be caused by the tool itself, its inability to utilize the pressure. But let's assume the tool has been properly cared for (there are some recommendations in the C&E-Monthly article of February, 1952, page 59) and is not at fault. That leaves us with two possible origins of the trouble —the compressor and the distribution system.

Following is a maintenance checklist for compressors and hose, supplied by The Compressed Air and Gas Institute.

Compressor Inspection

If your compressor is not supplying the desired air pressure or is below expected efficiency levels, it would be wise to check first its rated capacity. It may be that accumulative tool needs exceed the compressor capacity. In this case, additional compressors are needed. Assuming, however, that the compressor is adequate, has it been inspected regularly and adequately?

A general inspection of the entire unit is advisable after every 300 hours of operation. The compressor valves should be removed, inspected, and cleaned, and any bearing adjustments should be made. Rust spots should be cleaned and repainted, and hinges and joints particularly should be inspected and, when necessary, repainted. At all times special care should be given to the valves and compressor and engine bearings. These parts are subject to wear and the wear must be compensated or the compressor will be forced to shut down much earlier than need be.

Radiator and jackets should be flushed out every 30 days. If cooling water contains alkali, clean the cooling system with chemicals. If the compressor is to be out of service for a period of time, drain the radiator and pour in a quart of kerosene to resist rust. This applies in any season—but the draining *must* be done if the temperature is below freezing. When the compressor is not in use, place it under shelter. Excessive exposure does no equipment any good.

Lubrication, Air Intake

Proper grades of oil are important. "Any old oil" may mean "any old result". Users of portable compressors should follow the manufacturer's recommendations regarding lubricating oils, and purchase oils and greases from

(Continued on next page)

Pipe Size Recommendations for Transmission of Compressed Air at 80-125 Psi (Gage)

Volume of Air Transmitted (cfm)	Length of Run in Feet				
	50–200	200–500	500–1000	1000–2500	2500–5000
	Nominal Pipe Diameter in Inches				
30–60	1	1	1¼	1½	1½
60–100	1	1¼	1¼	2	
100–200	1¼	1½	2	2½	2½
200–500	2	2½	3	3½	3½
500–1000	2½	3	3½	4	4½
1000–2000	2½	4	4½	5	5
2000–4000	3½	5	6	8	8
4000–8000	6	8	8	10	10

Compressed Air and Gas Institute Photo

Careful servicing of your air compressor at regular intervals means not only longer compressor life but full production for your air-powered drills, grinders, riveters, and rammers.

reputable oil companies that will guarantee their lubricants as suitable for conditions encountered.

Lubricating-oil filters are installed to keep out foreign material. But such material, if permitted to accumulate on this filter indefinitely, will seriously impair the whole lubricating system and consequently the compressor. Clean oil filters as often as the accumulation warrants. This cleaning must be done each time a crankcase is drained.

However, even oil that is dirty or of improper grade is no match in destructiveness for impure air taken into the compressor for delivery to the tools. Portable compressors should operate in a clean atmosphere and should be set in a level position to obtain best results. Air cleaners for eliminating foreign particles are standard equipment on the modern portable compressor. Regular inspection and periodic cleaning will insure maximum service.

Operating, Handling

The first serious mistake in operating a compressor is to start it incorrectly: to set all valves for compression, start the motor or engine, and then begin using the power as soon as it builds up to pressure. Before a compressor is put into actual service, it should be operated with service valves wide open, without any possibility of pressure being built up; then the motor or engine should be run for several hours to insure thorough distribution of oil to all working parts—before any load is placed on them. After the breaking-in period, close service valves and then the "load" will have proper resistance through lubricated and cool operation.

A second invitation to trouble is this: hitching a portable compressor on the rear of a truck and hauling it at high speed. Here are the maximum recommended towing speeds:

Type Mounting	
4 pneumatic-tired wheels (without springs)	10–15 mph
4 pneumatic-tired wheels (with springs)	20–30 mph
2 pneumatic-tired wheels (with springs)	25–35 mph

If care has been taken to select the right size of compressor and to maintain and operate it properly, and there is still a low tool efficiency, the fault may lie in the distribution system.

Distribution System

Pressure drop in the air-transmission line between the discharge of the compressor and the tools it operates results in less work. Therefore the user should give careful attention to the selection of the size of hose or piping carrying the air.

Where the air is being transmitted relatively short distances, hose is much preferred. (An accompanying table gives the recommended sizes for transmission hose.) However, it is frequently necessary to locate a portable compressor at some distance from the work, and in such cases the air is transmitted through steel pipe of sufficient size to keep the pressure drop within economical limits. Tests have proved that the pipe should be large enough so that the pressure drop between the receiver and the point of use will not exceed 10 per cent of the initial pressure. (The table on the preceding page gives the recommended pipe sizes for transmission of compressed air.)

If large quantities of air are required, several portable compressors

(Concluded on next page)

Hose Size Recommendations for Transmission of Compressed Air at 80-125 Psi (Gage)

Rate of Air Flow (cfm)	Types of Air Tools	Recommended Hose Sizes (nominal diameter in inches)		
		0 to 25' long	25 to 50' long	50 to 100' long
0–15	Spray guns Drills, ¼-in. Light chipping and scaling hammers Impact wrenches, ⅜-in.	⅜	⅜	½
15–30	Drills, 5/16–½-in. Impact wrenches, ⅝-in. Chipping hammers Rock drills, 15-lb. and smaller	⅜	½	½
30–60	Drills, ⅝–1-in. Impact wrenches, ¾-in. Light grinders Rivet hammers Clay diggers Backfill tampers Small vibrators Light and medium demolition tools Rock drills, 25-lb.	½	¾	¾
60–100	Drills, 1–2-in. Impact wrenches, 1¼–1¾-in. Heavy grinders Large vibrators Sump pumps Rock drills, 35–55-lb. Heavy demolition tools	¾	¾	1
100–200	Winches and hoists Drifters Wagon drills Rock drills, 75-lb.	1	1	1¼

Getting the Full Output From Your Compressor

(Continued from preceding page)

are often connected to one common air discharge line. A very bad practice in this case, often resulting in rupture of the air receiver, is the use of a rigid steel-pipe connection between the common discharge header and the receiver on each individual portable. A flexible connection, such as a piece of rubber hose, should be installed between the receiver and the connection to the common steel header or pipeline.

Good distribution, whether by pipe or hose, depends on proper maintenance as well as on proper size. Essentially, maintenance involves regular inspections and leakage tests to determine the tightness of the lines and connections. In fact, one may go so far as to state that regularly scheduled inspections are mandatory.

The most likely locations of leaks will be around valve stems, hose connections, unions, drains, and lines leading to inoperative tools. Remember that every cubic foot of leakage eliminated is pure gain. Such losses in many systems will reach 10 to 20 per cent of the total air compressed. Although leaks may be small, they may be numerous, having a high total effect. A single 1/16-inch hole will waste 182,000 cubic feet per month, costing $9.10 for the air—not including the production loss.

New Water Repellent

A transparent silicone-base water repellent which is applied to masonry has been developed by Ranetite Mfg. Co., 1917 S. Broadway, St. Louis 4, Mo. The company claims that Ranetite No. 11 is easy to apply with either spray or brush, is effective against efflorescence, and has deep penetration to insure durability. Masonry treated with it is not sealed against breathing and can be painted without base paints.

Further information may be secured from the company, Or use the Request Card at Page 16. Circle No. 622.

Fuel-System Analyzer

An analyzer that checks the entire fuel system and mileage of internal-combustion engines has been developed by Choldun Mfg. Co., New Haven, Conn. It comprises a specially cast aluminum container and a clear plastic faceplate. All brass fittings necessary for any installation are furnished with the unit.

The unit tests actual operating fuel-pump flow and pressure, mileage, leaky or plugged gas lines, carburetor needle and seat, fuel level, and fuel-pump diaphragm. In cases where the fuel system of the vehicle is frozen or inoperative, the analyzer can be attached to the vehicle, manually filled, and used as an auxiliary fuel system for driving the vehicle to the shop without towing. The company points out that the analyzer is of special value for tune-ups, preventive maintenance, and emergency road service.

Further information may be secured from the company by requesting Form No. FSA-400. Or use the Request Card at page 16. Circle No. 699.

The Choldun fuel-system analyzer tests fuel-pump flow and pressure, mileage, leaky or plugged gas lines, carburetor needle and seat, fuel level, and fuel-pump diaphragm.

Air Reduction Magnolia Mgr.

John Lund is a District Manager of Air Reduction Magnolia Co., Division of Air Reduction Co., Inc., Houston, Texas. Mr. Lund, who succeeds the late Heber T. Wadley, will have sales responsibility for the Shreveport district with headquarters located at Shreveport, La.

Mr. Lund joined the company in 1927 and has had sales and service experience in various districts since that time. He was, at the time of Mr. Wadley's death, Assistant Manager at Shreveport.

This Browning cutting torch operates like an acetylene unit but burns gasoline and oxygen.

New Cutting Torch Uses Gasoline Fuel

A cutting torch that burns gasoline and oxygen has been developed by J. A. Browning, an instructor at Dartmouth College. It is manufactured by the Browning Torch Corp., and distributed by Steel News Industries, Inc., R. D. No. 2, Canonsburg, Pa. It is said to save money in cutting, brazing, scarfing, and similar work.

The torch operates like an acetylene torch. The gasoline and oxygen are blended, converted into vapor, and burn at the torch tip. However, the company reports that this unit is more economic and convenient to use than oxyacetylene equipment. The cutting head is designed to eliminate backfiring and backflashing in the torch handle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 642.

Prestress-Design Company Cuts Loose from Patents

A radical revision of operating policy has recently taken place in The Preload Co., Inc., New York, N. Y., consulting-engineer firm specializing in the design of prestressed-concrete structures.

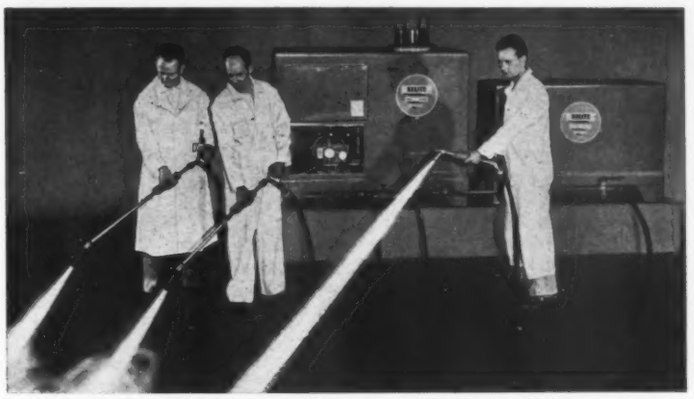
Preload, which has hitherto designed prestressed structures under license of its numerous patents (the industry-wide pattern of operation), now offers its consulting services to any client who wishes to employ the basic principle of prestressing, using its own unrestricted systems of prestressing as a control with which proprietary systems must compete. Preload clients can thus obtain competitive bids from general contractors, who, on their side, may choose competitively from among several prestressing systems. Preload undertakes engineering assignments for any type of prestressed structure, but does not compete with architects and engineers working in more conventional media. The scale of fees adopted by Preload is that recommended by the American Society of Civil Engineers for the type of technical service performed. Preload emphasizes that its fee is for the design of the structure, no matter which of the various prestressing systems it embodies.

Steam-Cleaning Unit Removes Ice and Mud

Production of a high-volume steam-cleaning unit is announced by Kelite Products, Inc., 1250 N. Main St., Los Angeles 12, Calif. The Power Master operates with two high-capacity steam guns, each delivering 150 gph, or one gun at 300 gph.

In addition to the large steam capacity, a high-pressure gun supplies 1,000 gph of hot or cold water at 500 psi. It is specially adapted to remove ice, mud, and heavy grease.

The unit is made with either a gravity-feed oil burner or a universal gas burner with adjustable blower. Standard equipment includes two swivel-type 150-gph nozzles, one 300-gph nozzle, and three 25-foot lengths of heavy-duty hose with safety fittings. Operating the cold rinse at 1,000 gph requires a water supply of 1,500 gph. The gas model, which is equipped with a shut-off switch in event of pilot failure, requires gas-line capacity of 1,000,000 Btu per hour.



The Kelite Power Master cleaning unit supplies 150 gallons per hour from each of two Hy-Vel steam nozzles (left); 1,000 gallons of hot or cold water at 500-psi from a Power Blast nozzle (right).

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 551.

Highway Bridge Over Big Muddy

Subcontractor Wary of the Fast-Moving Treacherous Missouri While Placing Piles and Caissons for Bellevue Bridge

By MICHAEL A. SPRONCK
Associate Editor

• THE swift flow and unpredictable nature of the Missouri River were big problems during the construction of pile and caisson foundations for a new toll bridge linking Iowa and Nebraska. The bridge is about 10 miles south of both Omaha, Nebr., and Council Bluffs, Iowa. William J. Howard, Inc., of Chicago, is building it, under a $1,978,000 contract, for the Bellevue Bridge Commission. Associated with Howard on the substructure, embankments, and paving are Condon-Cunningham Co. and Peter Kiewit Sons Co., both of Omaha, Nebr.; and on the superstructure, the Chicago Division of Bethlehem Steel Co.

Work on the substructure was nearly complete at the time CONTRACTORS AND ENGINEERS MONTHLY visited the job, and Bethlehem was getting ready to set steel. The men on the job had no trouble, though, remembering their tussle with Big Muddy. Folks living near the cottonwood banks of the Missouri can well attest to the mean and troublesome nature of the river when it's raging with silt-choked spring waters. It will twist and turn and run clear out of its channel to unload the extra water. The C-C-K outfit had to face the problem last spring when the river topped the levee and ran down an old chute about 200 yards in back of the bridge-building job.

C. & E. M. Photos

Design and Purpose

Bellevue Bridge is not spectacular as bridges go, but it has an efficient design well serving its purpose. Plans came from the boards of Kirkham, Michael & Associates of Omaha, retained as consulting engineer by the Bellevue Bridge Commission.

The substructure includes 10 piers and 2 abutments numbered west to east (Nebraska to Iowa). The west abutment and land piers 1, 2, and 3 are founded on steel bearing piles. Pier 4 is just off the Nebraska bank; originally planned as a pile foundation, it was changed to caisson. Pier 5 is in mid-stream and is a caisson. Pier 6, first on the Iowa bank, is on steel piles. Piers 7, 8, 9, and 10 and the east abutment are all on 40-foot timber piles. All but these last four piers and the east abutment are founded on bedrock, a good hard limestone with little or no deterioration in this area. The rock slopes about 2½ feet in 100 from west to east; this puts it from 70 feet below the ground surface at the west abutment to 100 feet at pier 6.

On the eastern side at St. Mary Township, Iowa, the bridge has three 70-foot continuous-beam spans and two 150-foot simple deck-truss spans approaching the river. The two main spans over the river are a modified Warren-truss design, continuous over the center water pier. Each measures 420 feet between approach and center piers. On the Nebraska side there are four 150-foot simple deck-truss spans leading to an embankment fill.

The bridge will carry two lanes of traffic on a reinforced-concrete deck some 50 feet above the river at high water. The deck has a 2-foot parabolic crown along the axis of the main spans but is standard in other respects. A new state highway will connect the eastern terminus of the bridge with U. S. 275 and a new county road will connect from U. S. 275 to U. S. 6 in Iowa. The western end of the project is in Bellevue, Nebr., a community now swollen to many times its original size by the U. S. Strategic Air Command base which has recently been constructed nearby.

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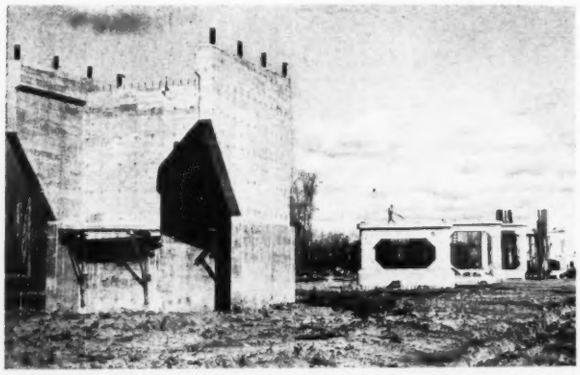
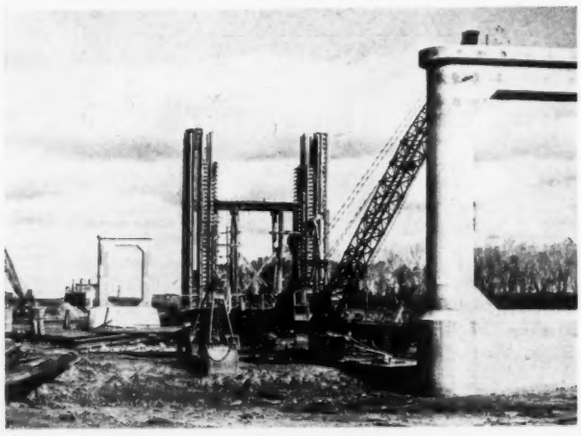
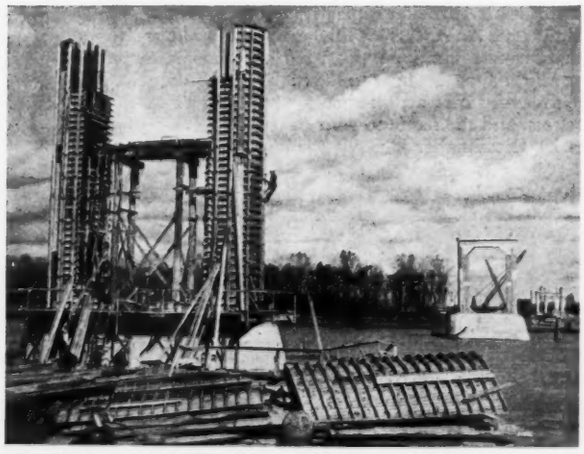


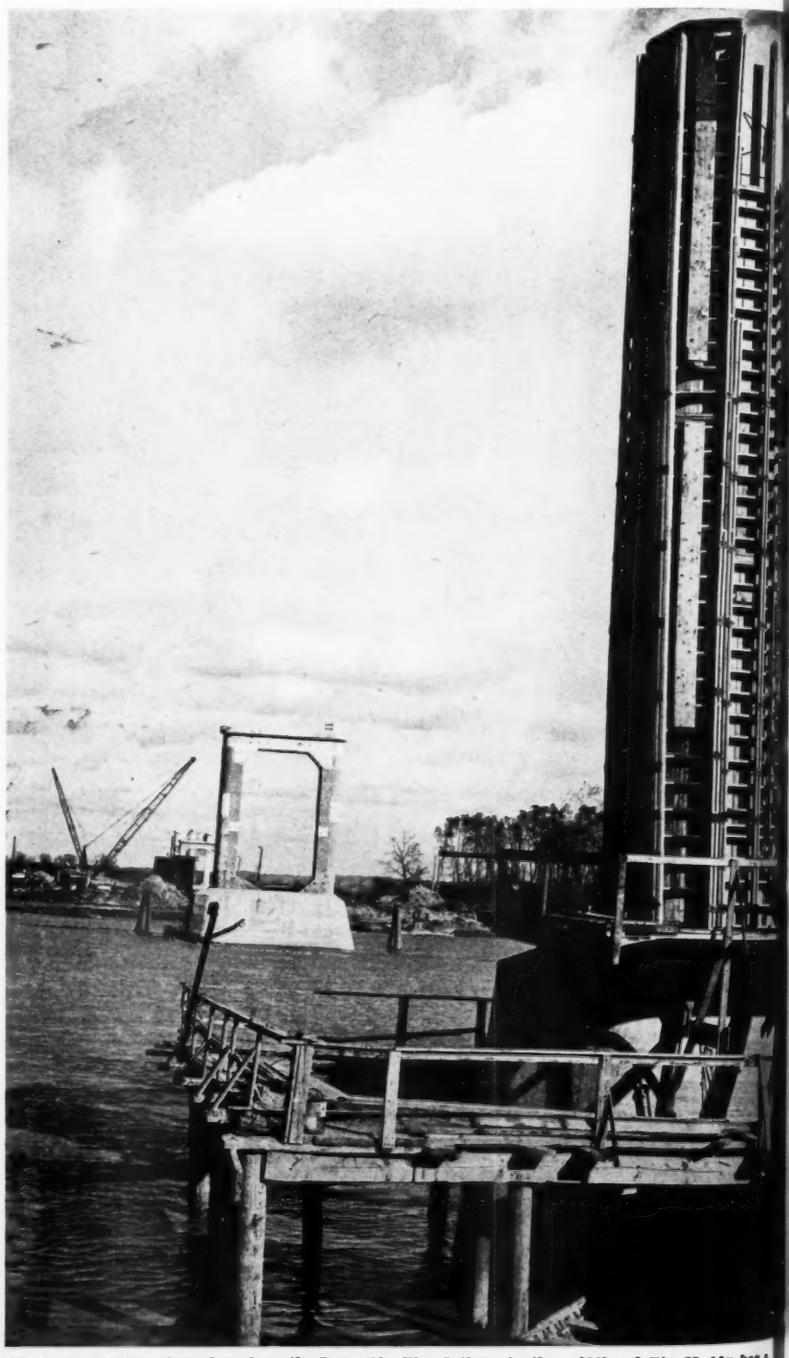
On the Nebraska side of Belleville Bridge we see the west abutment in the foreground and piers 1, 2, 3, 4, etc., in various stages in the background.



Moving up a little—pier 3 at right, then formwork for pier 4, and midstream pier 5. Land piers rest on steel piles; pier 4 on a caisson.



At water's edge, a closeup of pier 4 formwork. A pile foundation was planned for No. 4 but a shift to caisson avoided some tough driving.



And here's a better view of work on the Iowa side. Pier 5 there in the middle of Big Muddy has a caisson foundation; No. 6 is on steel piles; Nos. 7-10 are on timber piles.

When the bridge is opened in mid-1952, most of the tolls to pay off the bond issue will be from local traffic south of Omaha. But later, access arteries will tie it in with U. S. 6 for the cross-country traveler who wants to by-pass the Omaha and Council Bluffs areas.

Work Starts

Work was started in November, 1950, on the Iowa side. The contractor planned to get those piers and the mid-stream pier finished during the winter, when the river was at low level, before the spring breakup with its ice floes and raging waters. Then he planned to retire to the Nebraskan side, closer to headquarters and his concrete supply.

A 1½-mile access road was bladed across the flatlands to the river site by a Caterpillar No. 12 motor grader. Then work was started on a 350-foot tramway and dock out to the location for pier 5. The tramway was built on stub salvage piling 30 to 35 feet in length, capped with 12 x 12's. It was steel-beamed and covered with 3 x 12 timber decking to carry the heavy crawler cranes and loaded ready-mix trucks. The dock and tramway piles were driven by a Vulcan No. 2 single-acting hammer operating from a floating rig.

Sinking the Caissons

The two caissons for pier 5 had a 17-foot 6-inch outside diameter and a 10-foot inside diameter. No trouble was experienced in sinking them, since at this stage of the work the river was mild-mannered. The trouble came later, with pier 4.

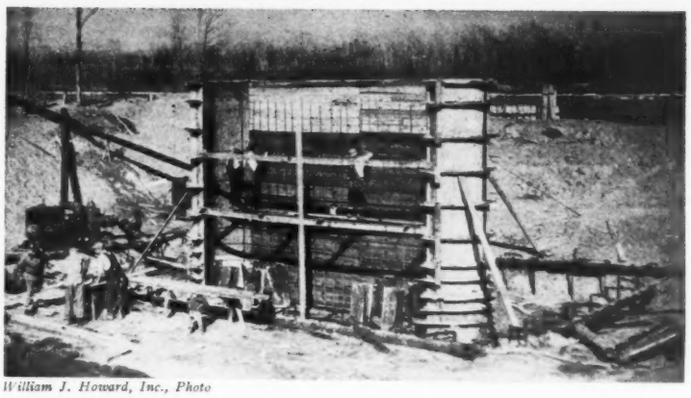
The caissons were made up in 10-foot lengths, and bolted and sealed as the job progressed to a full 83-foot 2-inch depth. Excavation was handled from the dock by a Northwest Model 6 with a 1½-yard clamshell. Easy-digging sand ran all the way below the 10-foot muck down to bedrock.

The concrete rings were poured in 10-foot lifts using a 6-bag Type 1 portland cement with 70 per cent sand and gravel and 30 per cent ¾-inch limestone. This mix was used on most of the job. Concrete was supplied by Ready-Mixed Concrete Co., Omaha, Nebr., and delivered in 4¼-yard Rex agitators mounted on 6-wheel International trucks. One-way haul from the plant to the Iowa side was about 17 miles.

With the two caissons in place, the rock was scraped and air-jetted, and the caissons poured full. The concrete was lowered into the caisson by clamshell; 10 per cent extra cement was added for all concrete placed under water. The area between the two caissons, which were set 34 feet on centers, was then enclosed with an interlocking sheet-pile cofferdam made up of 26-foot lengths of Inland Steel I-27 piling. A shop-made hairpin hammer, hung from the Northwest Model 6 crane, drove these piles in a day, and the contractor started in fast to form and pour the pier blocks. It was late January, and he expected trouble with the river at any time.

William J. Howard, Inc., Photo

At pier 6, some 60-foot lengths of U. S. Steel interlocking sheet pile are driven around the cofferdam frame.



William J. Howard, Inc., Photo

A Stang wellpoint system was used around the 20-foot-deep excavation for pier 3 of the Bellevue Bridge, for the Missouri River swept over levees north of the site and raced down an old chute behind the job.

While this work was going on, other crews had brought in a Northwest 95, equipped it with steel swing leads and a No. 1 Vulcan hammer, and driven the piles for piers 7 to 10. The piles were 10 and 14-inch creosoted timber, all 40 feet long. A Cleaver-Brooks Model LFM-8 gasoline-driven steam generator supplied the steam for all pile-driving and extraction work on the job.

As fast as the piles went in, footings and blocks were poured to bring the job above the ground line. All concrete on this work was heated with live steam from a small coal-fired burner. This phase was cleared in mid-January, 1951. A month later pier 5 was finished, and dock, tramway, and sheeting were removed. All operations were then shifted to the Nebraska side.

The Missouri Moves In

Operations on the west bank proved to be tough. The contractor started on pier 3, figuring to move toward the west abutment away from the river,

(Continued on next page)

New Highway Bridge Over the Big Muddy

(Continued from preceding page)

thereby avoiding the torrent of spring waters which he expected soon. But the river, outmaneuvering him, swept over levees north of the site and raced down an old chute 200 yards behind the job. The water overloaded the chute and spread out toward the main channel, coming closer and closer to the pier excavations.

The holes for these piers were 50 x 20 feet in area and about 20 feet deep. As soon as the river moved in back of the job it was necessary to use well-pointing. The contractor worked one hole at a time, using 49 wellpoints for pier 3, 75 for piers 1 and 2, and a full 100 for the west abutment, which was closest to the chute. The Stang well-point system had 21-foot risers on an 8-inch header. Two 8-inch pumps set on line were used alternately to keep the water down. Things got a little worrisome when the backwash of the chute came within a couple of inches of over-topping the excavation, but shortly afterwards upstream flow subsided somewhat and no further trouble was encountered in this phase of the work.

Piles for these piers were U. S. Steel 14 BP-89's and 14 BP-73's, driven by a No. 1 Vulcan hammer in the swinging leads of a Koehring 605 crane. The 89-pounders were used on part of the work because 73's were not available at the time (a common problem nowadays). As the piles were placed, the footings were formed and poured, followed by the blocks. Wellpointing was then taken out.

Formwork

When the weather got a little better, the contractor stopped heating the concrete, and early in the spring resumed work on the Iowa side. Pier columns and caps were then placed on both sides of the river.

Except for column clamps on piers 1, 2, 3, 7, and 8, the contractor used Superior ¾-inch Cone Fast coil ties throughout the job. The forms were basically 2 x 6 studs with double 2 x 6 wales faced with 1-inch sheeting. Plywood facing was used on the curved sections. All forms were coated with a Texaco light paraffin-base oil.

The columns and cap for pier 5 were formed and poured from floating equipment. A Koehring 605 operating from a 450-ton steel barge was used for this work. The concrete trucks dumped into two 1-yard Blaw-Knox buckets. These were then placed on a motor launch and ferried out to the pier. The Koehring picked them up and returned two empties for the other half of the truck load.

Tough Job on River Banks

Piers 4 and 6 were left until last to take advantage of the low flows normally experienced in late summer. The river, however, stayed unusually high throughout the year, and work had to start in spite of fast flows if the piers were to be finished in time for steel erection.

These piers support the main bridge section and were both designed with steel-pile footings. Pier 4 is in the water about 40 feet off the west bank and pier 6 lies back from the river about 100 feet on the east bank. The contractor elected, with the approval of the consulting engineer, to use caissons for pier 4 instead of the piles. In spite of some hazards from high waters, this proved to be a smart move, and avoided tough driving problems encountered on pier 6.

Pier 4 took smaller caissons than the ones used for pier 5—the 10-foot steel sections had a 14-foot 6-inch OD with an 8-foot ID. Work proceeded from a dock in the same way as for pier 5, except that a ¾-yard clamshell was used for the digging because of the smaller inside diameter of the cans.

The sinking was no snap at this location. Roots, stumps, and other debris knocked the cans out of line a couple of times. The problem was met by tying the caisson back to trees on the bank and excavating on the outside. Even so, it swung out of line and snapped some of the ¾-inch cable lines. After some good hard work the section was straightened out and the caisson kept on line.

The trouble was not over, though; unusually heavy summer rains choked the river and overwashed the cans three or four times after they were set to bedrock. A cofferdam of U. S. Steel M116 sheeting had to be used to hold back the waters and permit filling the caissons to grade. The block between the cans was then formed and poured. The bottom forms for the block were supported on about 20 salvage river piles capped with 12 x 12's and decked with 3 x 12 planking.

Pier 6 was constructed along the lines of the original design. Two 20-foot-square cofferdams were driven, one at a time, to open 50-foot-deep holes for driving the steel-pile foundation. The cofferdams were fabricated and erected on the ground using, for each, six sets of 14 BP-117's for waling, 14-inch steel posts, and an outside cover of 60-foot lengths of U. S. Steel M116 interlock sheeting. Driving and digging proceeded at the same time. Various hammers were used: a McKiernan-Terry 9-B-2, a Vulcan No. 1, and a 2,800-pound drop hammer.

When the hole was opened to a 50-foot depth, the U. S. Steel 14 BP-117 pier piles were driven to bedrock using a Vulcan No. 1 hammer and a 40-foot follower. The wales were then removed by flame-cutting, the sheeting pulled, and the hole backfilled.

It was no easy job to pull the sheeting. The contractor tore up a few wire-rope blocks and snapped a crane boom before he was able to get the sheet piles out. To do the job he finally used

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an A-flame made up of 14 BP-73 steel, a Northwest 95 crane, and a McKiernan-Terry E4 extractor—all reeved up with a 9-part line through 100-ton-capacity McKissick blocks.

On the second hole at pier 6 the contractor decided to put down well-points to relieve the pressure on the cofferdam. A system of 59 points, evenly spaced around a periphery 35 feet square, was used on a 6-inch header with an 8-inch pump. The points were jetted 34 feet below ground surface.

This was the stage of the work when CONTRACTORS AND ENGINEERS MONTHLY left the job. Operations were moving along fast and it was planned to start steel erection and proceed with it throughout the winter months.

Personnel

Project Manager for the substructure, embankments, and paving is Ray Terry. Jim Wilson is General Superintendent. The general contractor, William J. Howard, Inc., is represented by Harold Turner, Field Engineer. The Bellevue Bridge Commission is represented through its consultant engineer by Bill Michael, Resident Engineer.

Raymond C. Gaugler Dies

Raymond C. Gaugler, President of American Cyanamid Co., New York, N. Y., died on January 11 at the age of 59.

Mr. Gaugler, who had been with Cyanamid since 1917, served as Assistant Treasurer and Comptroller, and was named Treasurer in 1929. In 1939, he became Vice President in Charge of Finance, and in 1947, Executive Vice President. He was elected President on January 5, 1951, in succession to the late W. B. Bell.

Mr. Gaugler's successor as President of American Cyanamid is Kenneth C. Towe, who joined the company in 1926 and has been a director since 1939. From 1945 until his present appointment, Mr. Towe held the position of Vice President in Charge of Finance.

Prospects Are Dim For N. Y. C. Builders

Words of gloom were spoken in a setting of gaiety last January as building-trades employers of New York City met in the Grand Ballroom of the Waldorf-Astoria to take stock of their prospects in 1952. Almost 25,000 of the city's skilled building-trades workers are now without work, said Peter W. Eller, Chairman of the board of governors of the Building Trades Employers' Association, in his after-dinner report. Total unemployment could easily reach 75,000 soon, he added, unless Washington allocates more structural steel and other controlled materials to New York.

Mr. Eller pointed out that the volume of construction is down more than 50 per cent in New York City, while in other cities it is up or is holding its own. It cannot all be defense construction in those cities, he held. "It has been said that New York cannot expect to receive separate treatment. It is our complaint that there has been, in effect, separate treatment, and we ask that there be a correction."

Idleness and hardship for so many people does not constitute "maintaining our civilian economy", he warned. Moreover, building organizations are being scattered and their efficiency reduced—an efficiency which made 1947-1951 five years of unprecedented production.

New York builders yield to no group, he concluded, in their willingness to sacrifice their own for the national good. But they ask for equality of sacrifice and a fair distribution of the materials needed.

James A. Farley, Board Chairman of General Builders Supply Corp., was the other speaker at the BTEA annual dinner. He confessed himself baffled by the lack of steel for New York building, and "without wishing to criticize unjustly", blamed "bureaucrats" in Washington for improper distribution of materials. "It's possible", he said, "that some of those fellows in charge are picking on New York."

Mr. Farley then went on to speak generally of the need for more economy in Government, since there is "a bottom even to our barrel". We must "trim our sails here just as much as we can." He queried the wisdom of going so fast in our defense program, and concluded with the hope that those in Washington charged with responsibility will forget it is an election year and do what they should, letting the chips fall as they may.

Aeroquip Reorganization

Aeroquip Corp., Jackson, Mich., manufacturer of flexible hose lines and self-sealing couplings, has made new arrangements for the distribution of its products in south-southwest United States. It has terminated its agreement with its former distributor, Aeroquip Sales & Engineering, Inc., Fort Worth, Texas. Now specially trained sales engineers, operating from Aeroquip Corp. and its subsidiary Aero-Coupling Corp., Burbank, Calif., are serving customers in the 14-state area.

The first unit of Aeroquip personnel in the south-southwest area includes: Edison D. Heins, District Manager, Industrial Sales, Dallas, Texas; James Tilford, Sales Engineer, Houston, Texas; Jack Harlow, Sales Engineer, Birmingham, Ala.; William Pickens, Aircraft Staff Engineer, Wichita, Kans.; John McCarthy, Sales Engineer, Kansas City, Mo.; and Victor Emery, Sales Engineer, St. Louis, Mo.

A further announcement by Aeroquip Corp. concerns the appointment of Byron E. Snow as Manager of the company's new Chicago office at 1033 South Boulevard, Oak Park, Ill. Mr. Snow will cover the territory of northern Illinois, southern Wisconsin, and Iowa.

Get All Steel Into Use: Ryerson Plans Campaign

While recognizing that production scrap moves promptly to the steel mills without delay or prodding, Joseph T. Ryerson & Son, Inc., Chicago, Ill., steel distributor, feels that this is not enough. The company aims at prying loose unused steel and equipment and getting it into use, or, if it is found to be unusable, getting it scrapped. With this end in view, Ryerson recently announced a campaign backed by offers of free advertising.

In a letter to customers, Ryerson urges steel users to check their inventories of steel that isn't being used or marked for use, and their idle and discarded metal-working machinery and allied equipment; then to decide what ought to be sold, kept, or scrapped. To help steel users dispose of items they are willing to sell, Ryerson offers to publish classified advertisements without charge in its big pictorial-type newspaper.

The company expects that its plan, through mail, business-magazine advertising, and the personal work of Ryerson salesmen, will reach a large segment of American industry. It believes that this effort to free idle steel and equipment, by getting it into use or back to the mills as scrap, will help to relieve the pressure for new steel and to maintain a high rate of steel production.

Homestead Valve Field Mgrs.

Fred Schuchman and James E. Seifert are newly appointed Field Sales Managers for the Hypressure Jenny Division of Homestead Valve Mfg. Co., Coraopolis, Pa., manufacturer of steam cleaners. Mr. Schuchman, former National Accounts Representative for the company, is in charge of the eastern district; and Mr. Seifert, formerly Sales Promotion Manager, manages the central district. Garrett E. Winner succeeds Mr. Seifert as Sales Promotion Manager.

Welding-Alloys Directory

A 16-page directory of electrodes and welding alloys is issued by Eutectic Welding Alloys Corp., 172nd St. and Northern Blvd., Flushing 58, N. Y. It contains photographs, data, and technical information on low-temperature alloys for welding cast iron, steel, alloy steels, copper, brass, bronze, aluminum, magnesium, hard and machinable overlays, and for cutting all metals. A 2-page chart lists the uses, bonding temperatures, and tensile strengths of over 100 Eutectic alloys.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 643.

Concrete Pipe Made In New Desert Plant

United Concrete Pipe Corp. Establishes Pipe Plant That Will Serve Columbia Basin Jobs, Present and Future

•A MODERN plant for manufacturing concrete pipe has been built in the heart of the Columbia Basin in eastern Washington by United Concrete Pipe Corp. of Baldwin Park, Calif. It has been established on the Northern Pacific railroad at Moses Lake to take care of the fabrication of pipe for present and future jobs.

At present, UCP has Bureau of Reclamation contracts for 54, 66, and 78-inch-diameter pipe. The company has the triple lines for Quincy Pumping Plant of the Columbia Basin irrigation project, and some 13,000 linear feet of siphon pipe on the W-22 lateral near Ephrata.

United Concrete Pipe Corp. is one of the nation's leading specialists in concrete-pipeline manufacture and construction, and the decision to establish the Moses Lake setup was perfectly logical from a business standpoint. The company has in the past established similar plants at Tulare, Calif., Stockton, and several other places where the extensive use of concrete pipe was contemplated.

At the present time the plant is running non-cylinder-type pipe in 54, 66, and 78-inch diameters—also 54-inch cylinder pipe.

An Assembly Process

A great part of the credit for United's ability to outperform some of its competition is its assembly-line organization for the manufacture of pipe. Details which seem old-hat to company key men are the pride and joy of laymen residents of Moses Lake, and even the engineers of the U. S. Bureau of Reclamation are happy to point to the new plant as a key attraction in an engineering way.

Hoop steel for the reinforcing cages comes in by rail from Columbia and Bethlehem Steel Co. The end rings, also of steel, are fabricated in Los Angeles and shipped by rail to the yard. End rings and hoop steel are unloaded from the cars by a small Lima Paymaster truck crane, and stacked in piles close to the point where the material will be used.

The steel reinforcement for each pipe section is fabricated in the form of an inner and outer cage of spiral-twisted material. A special cage machine, driven by electric motors, winds the reinforcing steel, and welders tack the ends. The reinforcing steel is welded to the end rings to form a strong stiffener. Finished cages of steel are sent away from the machine on a chain hoist travelling on a monorail.

The inner and outer cages are then assembled in the yard just outside the cage machine. When the final welding is finished, these cages of steel are stored temporarily for use. When they are needed, an Ohio locomotive crane with almost ¾ mile of working track moves in and sets the cages in steel forms centered over level pouring platforms.

At present, the company has 16 sets of steel forms in both sizes. Later on,

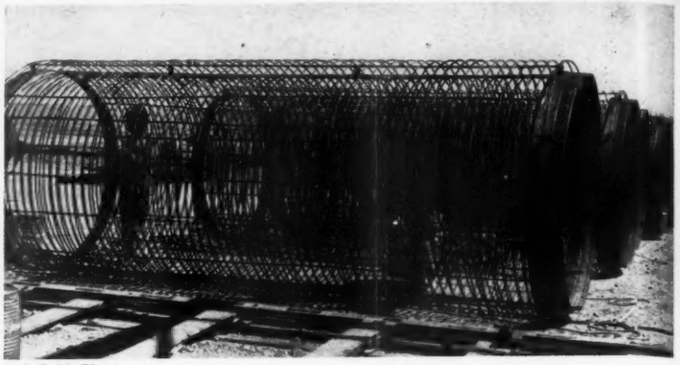
(Concluded on next page)

C. & E. M. Photo

Looking down the Northern Pacific tracks at Moses Lake, Wash., we see UCP's pipe-pouring forms in place, curing protection installed—and, in the background, a Lima crane handling a concrete bucket at the batch plant.

C. & E. M. Photo

A Lima truck crane handles steel reinforcement for pipe made at UCP's new plant.



C. & E. M. Photo

A couple of welders work on one of the mandrels of the reinforcing steel.

Concrete Pipe Made in New Desert Plant

(Continued from preceding page)

this number will be increased. The forms consist basically of steel facing with a center hinge and locking contrivance. A conical-shaped distribution diaphragm at the top of the form permits fresh concrete to feed evenly down into the shell.

The concrete for the pipe sections is proportioned by a company-built 300-ton batch plant. Sand and aggregate are produced by Columbia Sand & Gravel Co., hauled to the plant, and lifted by bucket elevator to the bins. A special set of shaker screens, also company-made, rescreens the aggregates to make sure they meet Bureau of Reclamation requirements.

The dry batches are combined with bulk cement, and mixed with water in a Koehring 56-S mixer on a platform in the batch plant. Concrete is then discharged directly to a 4-yard Gar-Bro bucket equipped with a compressed-air dumping mechanism.

The locomotive crane moves down the line of forms, carrying the 4-yard loaded bucket, and dumps wherever it is needed. Viber P2X external-type electric vibrators, mounted about one-fourth of the way from the base of the 16-foot forms, do all the vibrating from that one position. The 7½-inch wall of a 78-inch pipe section contains 9 cubic yards of concrete.

When the pipe sections are finished, they are cured with live steam from a 150-hp boiler for 12 hours and then subjected to an additional 24 hours of steam curing to attain the desired 3,500-psi design strength. The final steam curing is accomplished by setting large wooden boxes over three pipe sections and directing steam into each box. Then the steel forms are stripped. The locomotive crane has special rigging to pick up the sections one at a time, turn them from a vertical to a longitudinal position in the air, and store them on racks nearby.

Two 500-cfm Gardner-Denver air compressors in the boiler house supply compressed air for use around the yard. A new office building and warehouse have also been erected, and the company is about 90 per cent finished with its contemplated setup. When this magazine visited the plant in late September, the crew was turning out 20 sections a day without much trouble, and the outlook was favorable for an even greater output.

Booklet on Wood Products

A new 43-page "Weldwood Catalog" has been issued by United States Plywood Corp., 55 W. 44th St., New York 18, N. Y. It contains descriptions, photographs, specifications, and list prices of softwood and hardwood plywood, doors, plastics, and the many specialties which comprise the Weldwood family of products.

This literature may be obtained from the company by requesting Form 1052, or by using the Request Card at page 16. Circle No. 554.

The Airco No. 20 Radiagraph is a portable gas cutting machine which can travel either a track or a plate. An electric motor drives it.

Gas Cutting Machine Operates From Track

An Airco portable gas cutting machine, which can double as a traveling carriage for welding devices, is driven by an electric motor and travels on either a track or a plate. With the proper accessories, the No. 20 Radiagraph can cut a straight line of any length from the guide track, circles ranging from 2 inches to about 9 feet in diameter, and arcs with a radius of one inch to 4 feet. Using a combination of torches it will cut single and double bevels and parallel lines simultaneously.

The machine alone weighs 57 pounds and one section of track 15 pounds. In low range, it will travel at 2 to 12 inches per minute and in high range 10 to 60 inches per minute. Knurled wheels provide required traction, and a brake on one drive wheel is said to eliminate backlash. The transmission is a self-contained unit which can be disengaged to provide "free-wheeling" for rolling the machine by hand. All controls are mounted on one panel.

The operating mechanism, which includes the motor, governor, clutch, and electrical accessories, is mounted on an aluminum-alloy chassis. By removing several screws it can be lifted out of the one-piece body. Accessories are available with the unit.

Further information may be obtained from Air Reduction, 60 E. 42nd St., New York 17, N. Y. Or use the Request Card at page 16. Circle No. 570.

Recording Barograph

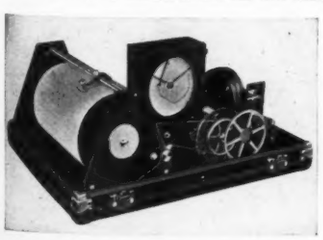
A new recording barograph has been developed by the American Paulin System, 1847 S. Flower St., Los Angeles 15, Calif. The Micro records a pressure curve over a range of plus or minus one inch mercury and can be used at any elevation from sea level to 10,000 feet by means of a reset.

The 24-hour chart is graduated in intervals of 0.005 inch mercury and is easily read to 0.001 inch mercury, the company says. Chart time is divided into intervals of ten minutes, readable to one minute. The curve is drawn on a specially surfaced paper by a metallic point, and no ink is used.

Precision graphs are supplied with each instrument for converting readings to the closest one-foot elevation where the instrument is used as a base recorder for altimeter surveys. This procedure makes it unnecessary to maintain a man at base.

The Micro is constructed on the nul or zero-gaging principle. All power in the actuating and recording mechanism is supplied by two heavy-duty sealed instrument clocks and no power is taken from the pressure-sensitive device. Weight of the barograph, complete with recording thermometer, charts, and carrying case, is about 30 pounds. Outside case measurements are 11 x 16 x 20 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 644.



The Micro barograph records a pressure curve over a range of plus or minus one inch mercury. It can be used at any elevation from sea level to 10,000 feet by means of a reset.

Television-Type Catalog Shows Excavator Line

A catalog shaped like the front of a television set and featuring one-knob picture control is available from Unit Crane & Shovel Corp., 6309 W. Burnham, Milwaukee 14, Wis. Illustrations of Unit equipment appear on the open slot "screen" as an interior disk is rotated.

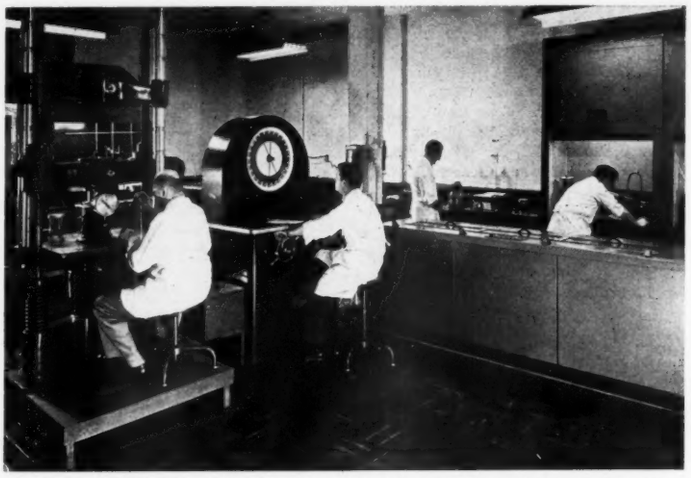
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 592.

New Lab Correlates Rubber-Road Tests

The Natural Rubber Bureau, Washington, D. C., opened a new research laboratory in Rosslyn, Va., last January. According to Warren S. Lockwood, Bureau Director, on-the-road testing of the stretches of rubber road so far laid in the United States and Canada seems to indicate that the addition of natural-rubber powder to asphalt makes paving less susceptible to the effects of weathering in general, less brittle in the winter, less soft in the summer, adds elasticity, reduces effect of shock and vibration, causes the paving to resist formation of ice film, and minimizes skidding. To correlate these on-the-road tests with laboratory research is the function of the new Natural Rubber Bureau Research Laboratory.

The laboratory was started over a year ago and is now one of the best-equipped labs of its kind in the United States, with facilities for conducting Hveem, Marshall, and Hubbard stability tests. Its technicians plan to make a variety of tests with every type of rubber (natural, reclaimed, synthetic, etc.) to find out the best method of introducing it into the asphalt paving material. Rather than make the varying specifications fit the rubber, the rubber will be fitted to the specifications of various localities. Road tests will be continued all over the United States, and core specimens from these tests will be analyzed in the laboratory. All field results will be interrelated and cross-checked with research findings. Evaluation of the use of rubber in asphalt is still somewhat of an untapped field in highway research, and in many cases it may be necessary to develop original test procedures. The laboratory will at all times adhere to the standards of the American Society for Testing Materials and the American Association of State Highway Officials.

"By the time we have found some of the answers we are looking for," says H. K. Fisher, Laboratory Director, "we shall have contributed a good bit of information on the subject of better and safer roads."



In the Natural Rubber Bureau Research Laboratory a rubber-asphalt specimen goes through a Hveem Stabilometer test on a high-compression machine. In the background: left, a technician runs a test on some rubber powder; right, a distillation test on volatile solvents used in rubber-road research.

Mineral Stabilizes Mastic Floor Surfacer

Uintahite, a mineral stabilizer, is now used by Flash-Stone Co. to add stability and strength to its high-density mastic flooring, Texas Jack Resurfacer. It is said to reduce the "pull" on vehicular traffic and to eliminate indentations in the floor from static loads.

In addition, the company produces a coal-tar water emulsion designed to coat the flooring and protect it against oils, gasoline, and most acid and alkaline solutions.

Further information may be secured from the company, at 30 E. Rittenhouse St., Philadelphia 44, Pa. Or use the Request Card at page 16. Circle No. 645.

Folder on Radio Station

A folder describing a 50-watt radio transmitter-receiver is available from Link Radio Corp., 125 W. 17th St., New York 11, N. Y. The 1498 Ed. 6-R is a complete assembly designed for point-to-point communication in the 72 to 76 - megacycle very - high - frequency band. A highly selective receiver provides at least 100-decibel attenuation of a signal 30 kilocycles from operating frequency. The folder illustrates the 34-inch-high fully enclosed desk-mounting cabinet with meters, switches, pilot lamps, loudspeaker grill, and handset and hangup box.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 572.

Richard A. Metcalf Dies

Richard A. Metcalf, Sales Manager of Miller Electric Mfg. Co., Appleton, Wis., died last December from a heart attack at the age of 42. Mr. Metcalf, who had spent 14 years in the welding industry, was appointed Sales Manager of Miller two months before his death.

A hinged carrier features the Elegrader elevating-grader attachment for Adams Models 550 and 610 motor carriers. It rules out dismantling to allow travel on the highway.

Hinged Attachment For Elevating Grader

A new elevating-grader attachment, with a hinged carrier that is folded during travel, has been announced by Williams & Reisser Co., P. O. Box 1126, 23rd and Hickory Sts., Omaha 1, Nebr. The Elegrader can be mounted on Adams Models 550 and 610 motor graders.

The hinged carrier requires no dismantling to allow highway travel, and eliminates normal clearance problems. Designed to permit maximum visibility in either operating or traveling position, the unit can be prepared for travel in less than 15 minutes, the company claims.

The carrier is equipped with a 36-inch trough-type belt which is said to have the same capacity as a 48-inch conventional flat-type belt. All troughing rollers are mounted on self-lubricated permanently sealed ball bearings. All other parts are mounted on either ball or roller bearings.

Use of the attachment requires no welding, cutting, or major alterations to the grader. Precision-made interlocking steel wedge plates reinforce the hinge on the carrier, assuring rigidity in either working or traveling position.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 646.

Line-Marker Guide

A flexible paint guide which enables the Econo-Liner to paint sharp, clear lines on rough surfaces has been developed by Universal Mfg. & Sales Co., 8716 Santa Fe Ave., South Gate, Calif. It permits the line marker to follow the contour of the surface when painting danger zones, traffic lanes, crosswalks, parking stalls, etc. on concrete, wood block, blacktop, or brick.

The Mark-Rite Econo-Liner can put down approximately 10,000 feet of line per hour. With its adjustable spring-loaded shields it paints a line from 2 to 6 inches wide and will mark as close as ⅛ inch alongside fixed objects. The machine is powered by a 2-hp 4-cycle engine. The compressor is a diaphragm type, twin cylinder, providing 4 cfm of air. The paint container has a 5-gallon-capacity and may be readily removed for cleaning. It is equipped with a quick-release handle to permit rapid reloading. The machine can also be converted into a spray rig to handle spray painting, stencil spraying, and other spray maintenance jobs.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 652.

With its new flexible guide, the Econo-Liner can follow surface contours and paint a sharp clear line on concrete, wood block, blacktop, or brick.

Charles S. Ackley Dies

Charles S. Ackley, Secretary and Director of McKiernan-Terry Corp., New York, N. Y., died last December at the age of 78.

He had been associated with McKiernan-Terry, manufacturer of pile hammers, heavy machinery, and special process equipment, and its predecessor companies for 43 years. In 1908 he helped to found Terry Core Drill Co., and in 1910 he played a large part in merging this company with McKiernan Drill Co. to form McKiernan-Terry Drill Co. From that time until 1929 he also took part in the successive mergers with additional companies which resulted in the formation of the present McKiernan-Terry Corp.

Mr. Ackley had several inventions to his credit, including an electrical bottom-hole heater for oil wells, and he held patents on processes for soil solidification.

Davey Compressor Ups Kieser

Frederic C. Kieser has been appointed Export Manager for Davey Compressor Co., Kent, Ohio. For the past two years Mr. Kieser has served as Export Field Manager in charge of sales in Cuba and South and Central America. In his new post he will be in charge of all of Davey's export.

Booklet on Shovel Series

The Lorain 50 Series of crawler units is featured in a 12-page booklet issued by Thew Shovel Co., 28th St. and Fulton Road, Lorain, Ohio. All four crawler models, with shovel, crane, hoe, and dragline attachments, are illustrated. Field photographs show the units doing a wide variety of work.

This literature may be obtained from the company by requesting Form 35555-1, or by using the Request Card at page 16. Circle No. 562.

Travel Plant Mixes Sand-Asphalt Base

Six-Inch Sand-Asphalt Course Topped With Bituminous Single Surface Treatment on Georgia Secondary Highway

• HARD pavement on Georgia's secondary highway No. 252 was extended 4.6 miles last season under a contract calling for a bituminous single surface treatment on a 6-inch sand-asphalt road-mix base course. The project is in Camden County, extreme southeastern county in the state, and is part of a well traveled route that connects U. S. 17, the Coastal Highway, at White Oak, with Folkston, where U. S. 1, U. S. 301, and State Routes 23 and 40 come together. Logging, pulpwood, and turpentine industries make extensive use of this No. 252 route connecting the Federal highways.

Of the 4.6 miles of improvement, 4 miles were Federal-Aid, while the 0.6 mile portion at the western end was State-aid only. The latter segment was added after the 4-mile part had been initially set up for construction. The job was awarded by the State Highway Department of Georgia to the Seaboard Construction Co. of Brunswick, Ga. Total estimated cost of the 4.6-mile project was $99,343.

Originally a dirt road for the entire 24 miles between White Oak and Folkston, a 5½-mile stretch was blacktopped by the Seaboard Construction Co. in 1950 from the intersection of U. S. 17 west to Tarboro. The new work extends this pavement from Tarboro to Mid River, and was completed last summer. Future contracts are expected to continue the surfacing to Folkston.

Grading

Regrading of the 18 to 20-foot dirt road was done in October and November, 1950, at which time the roadbed was widened and raised, and some sharp curves were straightened out in the alignment. The grade was elevated from 1 to 3½ feet on the average above the level of the old road, with the highest fill being 5½ feet over the fairly flat terrain. The surface treatment is 18 feet wide on a 19-foot base, and is flanked by 3-foot shoulders. From the center crown the pitch on each half of the pavement is 2 inches in 9 feet. In a typical section the front slopes are 3 to 1 to a ditch having a minimum width of 4 feet and a depth of 3 feet. Backslopes are 1 to 1.

Excavation totaled nearly 77,000 cubic yards, with practically all material coming from two borrow pits, one at each end of the job. The embankments were built up with sandy loam from the borrow pits, placed in 6-inch lifts over the gumbo soil of the old dirt road.

A Northwest dragline with a 35-foot boom and a Hendrix ¾-yard bucket worked the borrow pits, loading out to a fleet of 10 to 12 Ford trucks holding 5 yards of material each. A single Caterpillar D8 tractor with a LeTourneau 10-yard Carryall handled the

(Continued on next page)

C. & E. M. Photo

Asphalt for the Tarboro, Ga., job is loaded into a truck-mounted tank holding 750 gallons. At left is a Cleaver-Brooks heater. At right, a Littleford pump.

dirt-moving along the roadway. D7 and D6 Caterpillar dozers spread the layers of fill, which were compacted by a LeTourneau dual-drum tamping roller pulled by an International TD-14 tractor. A Caterpillar No. 12 motor grader looked after the final shaping of the roadbed, which was compacted further by traffic throughout the winter months, since the base-course work did not get under way until last spring.

Road-Mix Base

Early in April the contractor resumed operations, by shaping with the motor grader a windrow of sand-fill down the center of the roadbed. This windrow averaged 2½ feet in height, with a base width of 6 feet and a top width of 4 feet. RC-3 cutback asphalt to mix with the sand was shipped in tank cars from Savannah, Ga., by the Mexican Petroleum Co. to a siding of the Seaboard Airline Railroad at White Oak. In the meantime a Barber-Greene heavy-duty travel plant was dispatched from the contractor's yard in Brunswick, and set up at the west end of the job.

At the siding the cutback asphalt in the tank cars was heated to 150 degrees F or over by a Cleaver-Brooks heater, and then transferred to tanks mounted on trucks to feed the travel plant. Three tank-truck units were used, two holding 750 gallons and the third holding 1,200 gallons; all were mounted on Fords. The transfer was made with a Littleford 4-inch pump, powered by a Le Roi gasoline engine, that filled a 750-gallon tank in five minutes. Average haul with the asphalt from siding to job site was 7 miles.

On the road the truck backed into position at the rear of the travel plant, which pulled it along with a chain. The travel plant straddled the windrow of sand while the tank truck was on one side of it, thus permitting traffic to be maintained on the other side. The self-propelled plant moved ahead at the rate of 65 inches per minute, and contained a 625-gallon bitumen tank. The three tank trucks kept the tank on the travel plant filled at all times. As the plant moved over the windrow it picked up the sand and mixed it with the RC-3 asphalt at the rate of 3 gallons per square yard of finished base, 6 inches thick.

Directly at its rear, the travel plant pulled along as a transverse screed a 10-foot length of 10 x 10-inch timber cut out on the bottom to the crown of the road. When a curve was reached, the screed was flipped over so that the flat side was on the bottom, thus allowing for banking the pavement. The screed removed from the subgrade any marks left from the passage of the travel plant. Behind the screed the sand-asphalt road-mix was laid down in a trim windrow as the travel plant moved ahead. A half mile of mixed material was run out in the average 9-hour day.

On the day following the mixing, the motor grader spread the windrow back and forth across the roadbed, while disks and harrows were brought in to aerate the material still further. Then the 19-foot base course was rolled to a 6-inch compacted thickness with a Tampo rubber-tire roller pulled by an International ID-9 rubber-tired tractor.

C. & E. M. Photo

A Barber-Greene travel plant tows a tank truck along one side of a sand-asphalt windrow on Georgia's secondary highway.

Rolling continued until a density of 100 per cent Proctor was obtained, while at the same time the motor grader shaped the base to final grade and crown. Progress was steady as the base-course work proceeded from the western to the eastern end of the job, the only delays being due to rain. No mixing was done when the water content of the sand was 8 per cent or over.

Single Surface Treatment

A single bituminous surface treatment, type 2, was then put down on top of the base to a width of 18 feet. The

(Concluded on next page)

Travel Plant Mixes Sand-Asphalt Base

(Continued from preceding page)

extra 6 inches of base on each side were intended to prevent raveling at the edge of the pavement. First the base course was primed with RC-3 asphalt applied at the rate of 0.15 gallon to the square yard by an Etnyre 1,350-gallon distributor. This was followed with a shot of AC-15 asphaltic cement, 0.3 gallon to the square yard, both applications of bitumen being put on for the full width. The last shot was covered with M6 stone, spread on at the rate of 35 pounds to the square yard, and rolled in by the rubber-tire roller. The highway was at once opened to traffic.

The gradation of the M6 stone for the cover coat was as follows:

Sieve Size	Per Cent Passing
1-inch	100
¾-inch	90–100
⅜-inch	0–15
No. 4	0–5

Final operations consisted of dressing and grassing the shoulders.

Quantities and Personnel

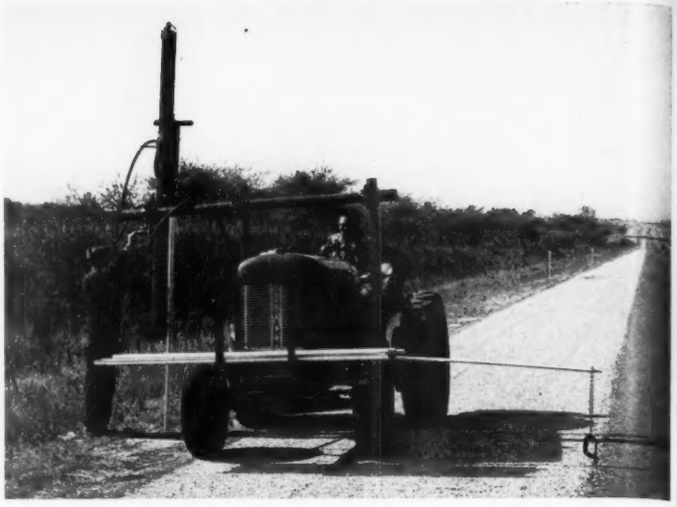
Major quantities in the total 4.6 miles of improvement included the following:

Excavation	76,905 cu. yds.
RC-3 for road-mix	151,399 gals.
RC-3 for prime coat	12,784 gals.
Single surface treatment	48,769 sq. yds.
Concrete pipe, 18 to 48-inch	1,400 lin. ft.

The Seaboard Construction Co., of which H. J. Friedman is President, employed from 15 to 25 men on the project under the direction of Jimmy Youmans, Superintendent.

For the Georgia State Highway Department, John D. Brogdon was Resident Engineer. The Department is headed by Jim L. Gillis, Sr., Chairman of the State Highway Board, with M. L. Shadburn, State Highway Engineer, and C. W. Leftwich, Construction Engineer. J. O. Bacon is Division Engineer at Savannah, the division in which this highway project is located.

Remember—Safety is no accident!



The Schramm Pneumadriver, with a 2-man crew, drove 350 stakes a day on this section of the New Jersey Turnpike.

Stake Driver Saves Time on Highway Work

A device for driving stakes or fence posts is manufactured by Schramm Inc., West Chester, Pa. The Pneumadriver is a 7-foot air feed with a paving breaker mounted on a Schramm Pneumatractor and fitted with a steel bit. The manufacturer claims that the unit has saved considerable hand labor in driving highway markers and stakes for snow fences; when a 2-man crew used it on a section of the New Jersey Turnpike, it drove 350 stakes per day.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 565.

To Combat Metal Shortage

Eutectic Welding Alloys Corp., Flushing, N. Y., is constructing a new wing to house two extra research laboratories. The current shortage of metals is the reason for this expansion, and Eutectic explains that a special staff of research chemists and physicists will concentrate on the development of new welding alloys utilizing fewer critical metals. Another project scheduled for this group is research on new metals such as titanium joining.

Atlas Chain Opens in NYC

A New York office is the latest addition to the branch offices owned by Atlas Chain & Mfg. Co., Philadelphia, Pa. The new office is located at 250 W. 57th St. Oliver J. R. Troup, Jr., is District Manager.

A double-head reversible ratchet wrench saved erection time for this Bailey bridge over a Korean river.

Double-Head Wrench Saves Time in Korea

In the accompanying photo, U. S. Army Lieutenant-General Edward M. Almond, CG, X Corps, tightens the last bolt on a Bailey bridge spanning an unnamed Korean river. The bridge was designed to be set up quickly by engineer battalions. The wrench used by General Almond is manufactured by Greene, Tweed & Co., North Wales, Pa., and is an adaptation of the company's standard line of Favorite reversible ratchet wrenches. The head of the wrench accommodates two different sizes of bolts used on the Bailey bridge, and by making it unnecessary to change wrench sockets, speeds erection.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 651.

Emergency Power Plants

A 4-page illustrated catalog on emergency power plants has been released by Universal Motor Co., 428 Universal Drive, Oshkosh, Wis. It contains general specifications for emergency-standby plants with capacities from 700 to 36,000 watts, in both gasoline and diesel models, air or water-cooled. The catalog lists four options for starting procedure for each model: manual, electric, remote control, and automatic. It suggests practical applications for the plants in case of power failure caused by storms, floods, fires, and mechanical breakdowns.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 654.

Euclid Branch Appointments

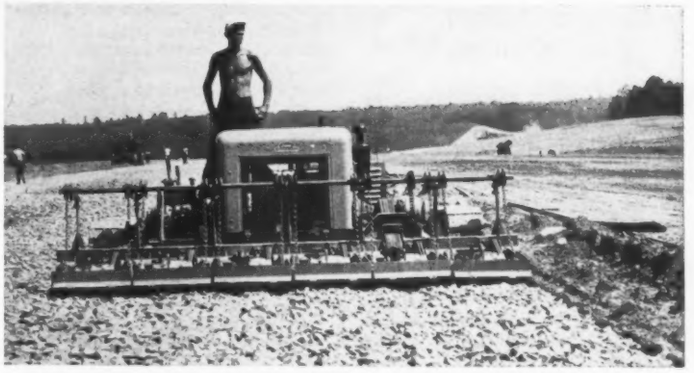
A new California sales and service branch is the latest news from Euclid Road Machinery Co., Cleveland, Ohio. The branch is at 339 W. Maple St., Monrovia, Calif., a suburb of Los Angeles. A. E. Sorensen, formerly Manager of Euclid's Emeryville branch, is Manager at Monrovia; Paul Hoffman is Office and Parts Manager; and B. J. Conway is in charge of service.

P. A. McDonald, formerly District Manager at Minneapolis, Minn., succeeds Mr. Sorensen as Manager of the Emeryville branch; and W. P. Sutherland, former Assistant to the Domestic Sales Manager, takes over Mr. McDonald's post of District Manager at Minneapolis.

Self-Propelled Unit For Tamping Subbase

A self-propelled tamping machine for single-course subbase construction is manufactured by International Vibration Co., 16702 Waterloo Road, Cleveland 10, Ohio. The recently improved Vibro-Tamper is designed to compact 15 inches of loose aggregate to 10½ inches with a 95 per cent Proctor density.

The crawler-mounted unit of all-welded construction weighs approximately 9,000 pounds and is powered by an 85-hp gasoline engine. V-belts transmit power to the six 24 x 18-inch vibrating shoes. Total ground contact of the 435-pound shoes is about 18 square feet. Eccentric gears and weights vibrate each shoe from 2,000 to 2,800 blows per minute with a compacting pressure of 4 tons per square inch. The Vibro-Tamper travels its 12½-foot course at from 16 to 45 feet per minute.



The Vibro-Tamper is for single-course subbase construction. It is designed to compact 15 inches of loose aggregate to 10½ inches with a 95 per cent Proctor density.

For single-course construction, the unit first compacts the coarse aggregate and then returns to vibrate dry screenings into the voids. It has compacted 3,000 square yards per hour on construction jobs, the company claims.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 573.

Radio Is a Danger Near Blasting Work

Exhaustive tests conducted by an explosives company have confirmed the reports that energy radiated from radio transmitters can, under certain conditions, explode electrically detonated dynamite caps. (See C. & E. M., Sept., 1951, pg. 50.) Although the conditions are rather special, the hazard exists. As a result of these tests the Department of Public Works and Highways of New Hampshire issued the following instructions to all employees.

1. Dynamite caps of the electrically detonated variety shall not be transported in a radio-equipped vehicle unless an emergency exists. In an emergency the radio set will not be turned on while the caps are in the vehicle.

2. No radio-equipped vehicle shall have its transmitter placed in operation, nor shall a portable set be operated, within 100 feet of any electric-blasting operation.

3. No blasting operations using electrically detonated caps shall be performed within distances set forth in the following table of fixed radio-transmitting stations such as commercial broadcast, police, fire, utilities, taxi, etc. If any doubt exists, a check should be made at the station to determine the power output. If a doubt still exists, necessary blasting is to be performed by using a nonelectrical method of detonating, such as cap and fuse.

Power Range (in Watts)	Minimum Distance From Blasting Operations Using Electric Caps
0–30	100 ft.
30–100	200 ft.
100–250	500 ft.
250–1,000	1,000 ft.
1,000–5,000	2,000 ft.
5,000–50,000	5,000 ft.
Above 50,000	10,000 ft.

4. Caps shall be transported in metal cans and such cans should never be opened within 50 feet of a radio transmitter. When in a car or truck, the can should be grounded to the frame.

Jobs With Army Engineers

Vacancies in 31 different classifications exist within the geographical boundaries of the Portland, Oreg., District, Corps of Engineers, U. S. Army.

At Lookout Point Dam, Lowell, Oreg.: a civil engineer, $4,205 a year; a field engineering-survey aid, $3,410 a year; and a core-drill-operator's helper, $1.57 an hour.

In Portland: a structural-engineering draftsman, $3,795 a year; and structural engineers, $3,410 or $4,205 a year.

Aboard the floating plant of the District: steam and diesel-marine oilers, fourth mate, second cook, deckhand, wiper, mess attendant, second assistant steam engineer, third assistant diesel engineer, fourth assistant diesel engineer, and general steam mechanic. Pay varies from $1.27 to $2.19 an hour.

Qualified applicants should mail Standard Form 57 (obtainable at first and second-class post offices), completely filled out, to The Employee Utilization Section, Personnel Branch, Portland District, Corps of Engineers, Room 669, Pittock Block, Portland 5, Oreg.

In addition to these vacancies, the Portland District announces that certain examinations are open until further notice: lockman, $2,974 a year; concrete-construction inspector, $3,410 to $4,205 a year; and general construction inspector, $3,410 to $4,205 a year.

Other examinations are now open for dragtender, motorboat operator, fireman-watertender, quartermaster, wiper, deckhand, steam-marine oiler, general drill-operator helper, core-drill operator, churn-drill operator, combination welder, and powerhouse operator. These positions pay from $1.41 to $2.29 an hour.

In order to apply for any of the above examinations, submit Standard Form 57 and Card Form 5001-ABC (obtainable at first and second-class post offices) to Secretary of the Board of U. S. Civil Service Examiners, Portland District, Corps of Engineers, 669 Pittock Block, Portland 5, Oreg.

Award for Form-Tie Display

First prize in the New York Chapter Producers' Council Table-Top Exhibit went to Richmond Screw Anchor Co., Inc., Brooklyn, N. Y. Five juries composed of architectural, engineering, and construction authorities unanimously chose the Richmond Screw Anchor display as the winner.

The display consists of a giant-sized blueprint. Against the detail drawings on the plan, mounted in proper assembly position, are actual samples of Snap-Tys, Form-Tys, Tyscrus, Tyloops, Tyhangers, screw anchors and bolts, inserts, and reinforcing accessories and screed chairs—all tying and anchorage devices for concrete construction. The ties and accessories are brightly plated. As set up in the local offices of Richmond's agents, the display is a complete "short course" to proper use of form ties and accessories in concrete construction.

The exhibit is to be shown during the coming months in various cities throughout the country.

Booklet on Small Trencher

Information on the Everett trencher is presented in a 4-page folder issued by Tractor Sales Corp., 1409 Santa Fe Ave., Los Angeles 21, Calif. On-the-job illustrations show how the trencher can dig 42 inches deep and 18 inches wide at speeds up to 5 feet per minute. The unit can be mounted on Ferguson, Ford-Ferguson, or Ford tractors. A McGee angle-blade dozer can be attached to the front of the tractor for back-filling.

This literature may be secured from the company, or use the Request Card at page 16. Circle No. 557.

New Bulletin Describes Long-Hole Drilling Tools

A bulletin describing tools for drilling 20 to 150-foot-deep holes is available from Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. Used with standard percussion-type rock drills, they include shanks, adapters, couplings, extension rods, and tungsten-carbide bits. They can be used to drill grout holes, test holes, sublevel bench stoping holes, or blast holes of standard 1⅞ and 3-inch diameters in any type of rock or ore and in any direction, the manufacturer points out.

The couplings and adapters are self-cooling and self-cleaning. The tools are designed to keep the hole in alignment and eliminate excessive vibration at maximum depth. Sectional steel can be made on the job when the user has his own shop.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 624.

New Almanac Supplement

An almanac supplement, listing 28 selected stars for determining azimuth, is an innovation of the 1952 edition of the ephemeris put out by W. & L. E. Gurley, Fulton and Station, Troy, N. Y. The supplement to the 84-page pocket-size ephemeris is an abridgment of the "American Nautical Almanac", and gives complete instructions for determining azimuths by methods similar to those used in observations of the sun and Polaris. A column added to Table I in the main ephemeris gives Greenwich hour angle of the vernal equinox for 0^h Greenwich civil time for each day. A table in the supplement allows reduction to the time of observation. The main section of the ephemeris includes definitions of astronomical terms, descriptions of methods of observation, and examples of reducing data for determining a true meridian.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 579.

Catalog on Wire Products

An 87-page catalog of wire nails and products is available from Bethlehem Steel Co., Bethlehem, Pa. It lists stock and nonstock sizes of practically every type of nail. It also gives information on barbed wire, fence, baling wire, and steel fence posts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 593.

Scarifies ost Surfaces

Slopes Banks — up to 2:1

Cuts and Cleans Ditches

Strips Sod

can handle so great a variety of jobs —at a new low cost

WEIGHT lb. (bare)
BRAKE famous Allis-Chalmers engine)
SPEEDS ward, to 18.6 mph 2.9

Finishes Between Forms

Grades Shoulders

Feathers Out Windrows

Levels Subdivisions

Works and Spreads Oil Mix

Loads Surplus Dirt

Handles Terracing

Plows Snow

Loads Snow

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IMPLI RVICING

HRB Projects Are Reviewed at Meeting

Speaker Approves Technical Work of Road Departments, but Scores Finance, Taxation, Management, and Safety

• "THE majority of the highway departments are doing outstanding work in their technical operations, but are failing to meet their obligations where public relations and human behavior are concerned, such as in highway finance, taxation, management, and accident prevention on our streets and highways." Such was the belief expressed by Ralph A. Moyer, Chairman, Executive Committee of the Highway Research Board, at the 31st Annual Meeting of the HRB held in Washington, D. C., January 15-18.

Speaking at a general session, the Board Chairman from the University of California emphasized that even though highway departments share responsibility in these matters with other public and private agencies, there is no reason for permitting present intolerable situations to continue. The Highway Research Board, according to Moyer, is in a better position than ever before to take a leading role in solving these important problems through its committees, the correlation services, and its newly developed program for conducting cooperative research.

Moyer reviewed HRB activities during the past two years, when it assumed the responsibility for supervising and administering three research projects jointly financed by various states and other agencies. These activities included: (1) the Maryland concrete-pavement tests in which 11 states, the District of Columbia, Bureau of Public Roads, 17 truck manufacturers, 14 petroleum companies, and the U. S. Department of Defense cooperated; (2) a project on the effect of wind stress on bridges in which 18 states, the District of Columbia, and the Bureau of Public Roads are cooperating; and (3) the Western Region Road Test for which design and construction plans and financing have been completed. Construction of this project will start in the spring at a selected site near Malad in southern Idaho.

Future Work

During the past year the Mississippi Valley Association of State Highway Officials requested the Board to study the matter of a large-scale comprehensive road test to be conducted in the middle west. A task committee has been at work preparing detailed recommendations for the test, which the committee estimates might cost over $1,000,000.

The Board is also engaged in supervising and administering four other projects financed jointly by private and public agencies. These projects concern (1) nonrigid-pavement design (Hybla Valley); (2) intergovernmental relationship in highway affairs (Maryland); (3) calcium-chloride soil stabilization; and (4) off-street parking and its relationship to business.

An important feature of these projects is that they have brought together many organizations with a vital interest in highway transportation but with widely different points of view. Among the organizations represented are the motor clubs, trucking associations, the motor-vehicle manufacturers, the petroleum industry, and highway engineers and public officials from the various states and the Federal government.

Tax Program Needs Overhaul

Professor Moyer suggested that the HRB invite private industry to participate more fully than at present in committee activity and cooperative research on highway finance and taxation problems. Citing the inequality of taxes in different parts of the country, the Chairman stated that it is difficult to explain why state gas taxes should be as low as 2 and 3 cents in one state, and as high as 8 to 9 cents in other states nearby; why registration fees for cars should range from $3.00 to $24.00 per year; for single-unit trucks from $10 to $110, and for combinations from $45 to $450 per year.

He pointed out that there is a wide margin between the 2 cents per vehicle mile which toll-road users pay in average tolls and taxes, and the prorated tax of ½ cent per vehicle mile on free roads. The margin clearly indicates, he said, that our highway tax program needs drastic overhauling.

"The toll roads which are in operation today are in my opinion serving a useful purpose in many different ways. I will name only two: first, the designers and builders have for the most part not been inhibited by lack of funds as has too frequently been the case in the design and construction of free roads. In general, the design standards on toll roads are higher and the construction methods the equal of the best used in free roads. A second

(Concluded on next page)

Winner of the 1951 George S. Bartlett Award for outstanding contribution to highway progress is C. S. Mullen, Chief Engineer of the Virginia Department of Highways. The honor was conferred on him at the 31st Annual Meeting of the HRB in January.

important advantage of toll roads is that they should bring about unmistakable realization to highway users of the true value of highway improvements of this type, and should also indicate the cost per vehicle mile required to provide adequate highway transportation service, and the taxes required to make such highways self-liquidating."

Rising Costs

While highway tax rates have remained relatively static, according to the HRB Chairman, highway construction costs in 1951 more than doubled the costs in 1941. Studies of highway deficiencies on a nation-wide basis have indicated that more than 30 years will be required to eliminate existing deficiencies at the present rate of construction. On the 37,000-mile Interstate System, for which the construction costs are estimated to be $11.3 billion, it is estimated that 100 years would be required to complete the job at the present rate of construction.

In a committee report on maintenance costs, H. A. Radzikowski, Chairman, Maintenance Branch, Bureau of Public Roads, said that highway maintenance costs have increased $80 per mile in the last year. With a total of 600,000 miles on the state highway system, state highway departments need nearly $50,000,000 over last year's maintenance budget just to maintain these roads. To do the maintenance job properly, Radzikowski estimated, $2 billion would be needed. The sharp rise in costs he attributed chiefly to labor, since materials, equipment, and administrative costs had shown but minor increases.

Well Attended

The week's meeting, divided into 29 separate sessions at which over 150 technical papers and reports on highway research were given, was attended by more than 1,250 engineers, scientists, highway officials, educators, and technicians. Business meetings were also held by 45 of the Board's departments and committees.

Winners of the award for the best paper on highway research published by the HRB last year were Thomas J. Carmichael, Detroit, Administrative Engineer, General Motors Proving Ground, and Charles E. Haley, Phoenix, Ariz., Project Engineer of the HRB Committee on Vehicle Characteristics. Their paper was a study of the statistical measurement of relationships between vehicle, roadway, and traffic conditions. The studies were made by means of special statistical instruments, and the paper largely concerns the development and use of these statistical machines.

The work of Carmichael and Haley was sponsored by the Committee on Vehicle Characteristics with the cooperation of the automotive industries. The statistical instruments were used to measure speed, fuel economy, deceleration, throttle opening, and related aspects of automobile operation. The engineers found that motorists and truckers can save gasoline through the use of special driving techniques, but further research is needed before suggestions can be fully developed.

Bartlett Awards

The George S. Bartlett Award, conferred annually on an individual who has made an outstanding contribution to highway progress, was presented to Claree S. Mullen, who has served continuously as Chief Engineer of the Virginia Department of Highways since that post was created in 1924. He is the first southeastern engineer and the first member of the Virginia Department of Highways to be so recognized. The recipient of the award is chosen by a three-man committee composed of one representative each from the American Association of State Highway Officials, American Road Builders' Association, and the Highway Research Board.

A native of Petersburg, Va., Mr. Mullen, 68, is a graduate of the Virginia Military Institute, and went to work for the Highway Department in 1908 when that organization was only two years old. His father, the late Judge J. M. Mullen of Petersburg, was a gunner in the Army of the Confederacy.

A second George S. Bartlett Award, together with the HRB Distinguished Service Award, went posthumously to Roy W. Crum, late Director of the Highway Research Board. The DSA is given in recognition of outstanding achievement in highway research. Both awards were presented by Thomas H. MacDonald, Commissioner of the Bureau of Public Roads, who was the first winner of the Bartlett Award in 1931. Fred Burggraf, who succeeded Mr. Crum as Director of the Highway Research Board, accepted the awards for the family of the late Mr. Crum.

Research Projects

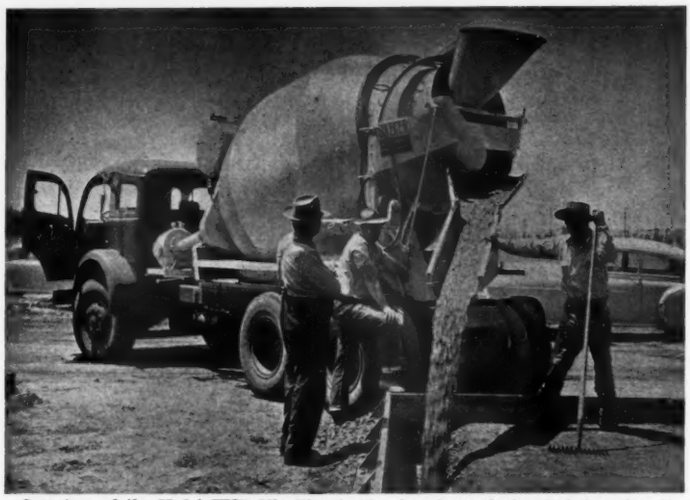
A further report on Road Test One-MD, the Maryland concrete pavement, was given by Fred Burggraf, Project Chairman, and several of his associates. A colored moving picture, illustrating the various steps in the test, was also shown. All the data on the test have not been completely analyzed and correlated, and the HRB did not issue a final report on its findings.

G. S. Vincent, Principal Highway Bridge Engineer of the Bureau of Public Roads, gave a progress report on the special cooperative project—Wind Loads on Bridges. This test was made with models representing the prototype bridges to a scale of ½ inch to the foot. It took place in the 8 x 10-foot wind tunnel of the Bureau of Aeronautics of the Navy, located at the David Taylor Model Basin, Washington, D. C. Wind velocities up to 100 mph were reached. Two models were used—a two-lane girder structure simulating an approach span of the Chesapeake Bay Bridge, and a two-lane truss model simulating a 250-foot span on the Alaska Highway. As the tests were made in December, 1951, and January, 1952, only a part of the test data have been analyzed, and no conclusions were stated at the meeting.

Truck Mixer Features Weight-Saving Design

A truck mixer in 3, 4½, and 6½-yard sizes, designed to meet the problem of load limitations, has been announced by The Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. The Model HMD Mix Plus is said to have a fast-charging and discharging drum with dual-mix action, to which additional equipment may be added to meet operators' requirements. It has mudguards and catwalks, assembled as a complete unit, and a 3-piece chute.

The mixer can be equipped with an open-type end loader, a sealed end loader, or a removable top door and sealed discharge door. Both the rear door and sealed end loader are designed to open or close with a turn of a hand wheel. One 24-inch movement of a hand lever fully opens or closes the open-type end loader. The sealed end loader has built-in pressure lubrication said to protect against grout entry and flush the seal every time it is lubricated.



Operators of the Model HMD Mix Plus truck mixer have plenty of choice when it comes to the power unit, loader, water system, etc., to be specified. Mixer sizes are 3, 4½, and 6½ yards. The Jaeger Machine Co., Columbus, Ohio, is the manufacturer.

The Mix-Plus may be powered by a Continental engine, Chrysler engine with fluid drive, or power-takeoff adapter for truck-engine drive, plus a selection of transmission types on the engine-equipped models. It permits a 3-way choice of unit without water system, with a 2-compartment tank equipped with either automatic or sight gage measuring, or with a single flush tank. All tank-equipped models are supplied with a Jaeger high-pressure water-injection system delivering 60 gpm at 65 psi through the groutproof water jet in the drum and to the wash-out hose.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 555.

New Highway Sprayer Covers 44-Foot Swath

Sprayers with special application to roadside work are manufactured by Hanson Chemical & Equipment Co., Beloit, Wis. Mounted at the side or rear of a truck and operated from the power takeoff, they will cover a 44-foot swath on right-of-ways, parks, and yards, the company claims. The units can also clean machinery, trucks, or equipment.

The Brodjets are said to be compact and easy to mount or dismount. All controls are set near the operator's hand. Pressure is automatically kept uniform, and can be maintained at 10 psi and higher.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 647.

New Plastic-Pipe Company

Manufacturers Corp. of Ohio, with headquarters at Mansfield, Ohio, is a newly formed company which offers plastic pipe and fittings in flexible, semirigid, and rigid types in ½ to 6-inch sizes. Its President is G. E. Leadbetter, who was formerly connected with Barnes Mfg. Co. Vice President is William R. Hite, formerly of Johnston Water System Co., of Mansfield.

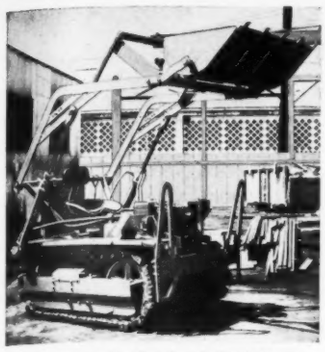
Sixteen groups of factory representatives, comprising 51 field men, represent the new company, and warehouse facilities will be offered at principal points throughout the country.

"Oh, excuse me, sir! I didn't realize I was blocking your view."

Catalog on 16-Inch Drills

A catalog on the 16-inch 3000 Series sliding-head drills is available from the Canedy-Otto Division of Cincinnati Lathe & Tool Co., Disney and Rogers Sts., Oakley, Cincinnati 9, Ohio. It lists features and specifications for various bench and floor models and explains that this series has a drilling capacity in cast iron up to 1 inch with a 1-hp motor.

This literature may be obtained from the company by requesting Catalog D-108, or by using the Request Card at page 16. Circle No. 655.



This hydraulic front-end bucket—capacity, 5 cubic feet—is now available for the small Agricot crawler tractor.

Hydraulic Bucket For Small Tractor

A high-lift hydraulically operated front-end bucket for the Agricat crawler tractor has been placed on the market by Earl H. Pence & Co., Inc., 2150 Washington Ave., San Leandro, Calif. The Agricat is a midget-sized (6-foot-long) tractor; with the bucket attachment it may be used for light earth-moving operations.

The 5-cubic-foot-capacity bucket is powered by a Vickers pump with a pressure of 1,000 pounds per square inch. The pump feeds into two rams whose pushing capacity is 491 pounds and whose pulling capacity is 368 pounds per 100 pounds of pump pressure. The bucket lifts to a height of 68 inches from the ground level, and can be lowered 4 inches below track level.

The Agricat now has a long track which adds 8 inches to the previous 36-inch track length, and gives stability in handling the bucket. The track is available in either standard steel or rubber.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 648.

Tool-Dust Collector

A self-contained dust collector for sanders, saws, jointers, and planers is manufactured by Aget-Detroit Co., 602 First National Bldg., Ann Arbor, Mich. This unit, previously designed for direct drive on 50 or 60-cycle power, is now available for operation on 25-cycle power. The Model JS Dustbuster is powered by a ⅓-hp continuous-duty motor and driven through a V-belt drive. Removal of the collected dust is quick and easy, according to the company. Setup of the unit requires bolting the uprights to the sides of the cabinet, connecting the motor, and connecting the inlet of the collector to the source of dust.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 653.

Sander Line Changes Hands

Porter-Cable Machine Co., Syracuse, N. Y., has sold the patent rights of its floor-sanding machine line and the tools and fixtures for its manufacture to The Clarke Sanding Machine Co., Muskegon, Mich. The transaction enables Porter-Cable to devote more time to the engineering and distribution of portable electric tools. In the past three years The Porter-Cable Machine Co. has purchased the assets of three portable-tool companies: The Unit Electric Tool Co., Syracuse (routers, shapers, and planes); The Sterling Tool Products Co., Chicago (finishing sanders); and The Johnson Engineering & Sales Corp. (air sanders).

Catalog on Steel Products

A 44-page book describes the people, products, services, and equipment of International Steel Co., Evansville 7, Ind. Illustrated profusely, it takes the reader through the offices, shops, and mills where the steel is fabricated, and then out to the job where it is erected. Information is given on International's structural steel, tanks, railroad cars, revolving doors, airport hangars, and truck bodies.

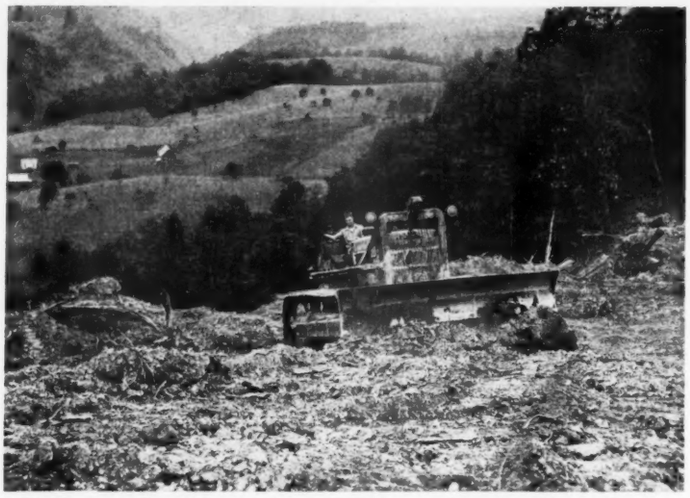
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 598.

Baun Construction Co., Fresno, used a Buffalo-Springfield tandem roller with a Gardner roll to compact soil-cement-treated base, base-course, plant-mix surface, and finish course on a highway project in Fresno County, Calif. The roll has 72 compression pads which enter and leave material with a minimum of displacement.

Mountaintop Airport

An airport balanced on mountain peaks is under construction in West Virginia. The first landing strip, considerably steadier than it sounds, is taking shape at Mercer County Airport, between Bluefield and Princeton, W. Va. The mountain peaks are being sliced off to provide a level area in this terrain where grade elevations range from 2,811 to 2,874 feet. The original landing strip will be 300 x 2,600 feet; two more strips—to be added in the near future—will be 400 x 5,100 feet and 100 x 4,900 feet. A terminal building will complete the project.

The cost of the $1,500,000 field is to be borne jointly by the Civil Aeronautics Administration and Mercer County, which awarded the initial contract to Keely Construction Co., Clarksburg, W. Va. Using crawlers and scrapers, Keely is moving 430,000 cubic yards of earth on the first phase of the job and providing 4,105 linear feet of storm-water drains.



Climbing up to Mercer County Airport, W. Va., now under construction, an International TD-24 tractor dozes an access road. Keely Construction Co., Clarksburg, is the contractor on the first phase of this "airport in the sky".

Mercer County Airport will be served by two airlines and will handle the private traffic from two cities, so it is expected eventually to exceed the Charleston, W. Va., Airport in total traffic.

Data Book for Civils Revised and Expanded

The first two volumes of the widely used reference "Data Book for Civil Engineers" by Elwyn Seelye have been considerably revised and expanded and are now available in a second edition. Volume I covers general civil-engineering design, and Volume II includes sample specifications on practically all types of construction. A third volume entitled "Field Practice" gives information needed to inspect engineering work.

Volume I, "Design", originally offered tables, illustrations, formulas, and details of design on virtually every phase of construction. The revised book has added more material on soil behavior, airfield layout, rigid-frame design, industrial-wastes treatment, express highways, and hydrology.

The first edition of "Specifications and Costs", Volume II, demonstrated how to invite bids, prepare proposals, and write contracts and specifications. Its scope has now been broadened to cover specifications on swimming pools, seeding and sodding, and the elements of an industrial building. Construction indices have been used to give costs of many types of miscellaneous structures.

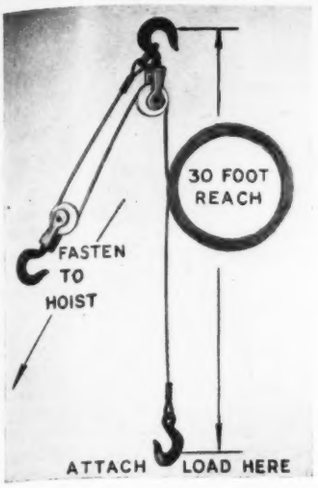
Both volumes are 9⅜ x 11¾ inches and each contains over 500 pages. The design book employs an easy-to-read hand-lettered type. Standard print is used in Volume II.

"Design" is priced at $10.00 and "Specifications and Costs" at $13.00. Both can be purchased from John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y.

Koppers Promotes Hartzell

John A. Hartzell has taken over the position of Sales Manager of the Engineering and Construction Division of Koppers Co., Inc., Pittsburgh, Pa. He succeeds Ward L. Gable, who has retired but will remain with Koppers as a special sales consultant.

Mr. Hartzell, who started work with Koppers in 1922 as a draftsman, has filled the posts of engineering section head, plant operator, contract engineer, and sales engineer. For five months prior to his present appointment he was Assistant Sales Manager of the Division.



Used with the Lug-All winch hoist, the Longlift will raise motors, pipes, heaters, and similar objects, as high as 30 feet above the ground.

6 Lb. Hoist Accessory Can Make 30-Foot Lifts

A new lightweight accessory that permits 30-foot lifts with the Lug-All hoist has been developed by The Lug-All Co., 331 E. Lancaster Ave., Wynnewood, Pa. The Longlift, as it is called, is used for raising motors, pipes, unit heaters, or other construction equipment to locations as high as 30 feet above the ground. Only the 6-pound accessory need be taken up the ladder for overhead suspension. Its capacity is 750 pounds. The manufacturer recommends its use with the 1½-ton-capacity Model 3000 Lug-All winch hoist.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 656.

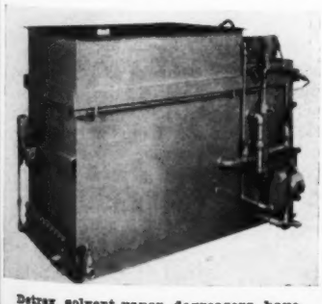
Redesigned Degreaser

A completely redesigned and improved model of a hand-operated solvent-vapor degreaser is announced by Detrex Corp., P. O. Box 501, Detroit 32, Mich. The VS-800 uses nonflammable chlorinated hydrocarbon solvents, either trichlorethylene or perchlorethylene, for removal of oil and grease from all kinds of metal products. The usual cycle of operation is vapor cleaning, then flooding clean solvent over the work with a hand-held spray lance, followed by pure-vapor cleaning.

The new model takes up a minimum of floor space, has a lower working height, and features an efficient new-style solvent condenser. As the clean-solvent storage tank is integral with the main machine body, the inside work space has been cleared of all projections, including the solvent-collecting trough, condensing coils, and vapor-level control bulb; thus the entrance for work being cleaned is unobstructed. Relocation of the solvent storage space has made operation easy from either side of the machine.

The redesigned model also features simplified piping and water-separator arrangement, a large access door for easy cleaning of the solvent storage section, and a redesigned condenser coil that provides a greater volume of distillate for slushing. A standard heating-door opening is provided to accommodate the interchange of heating means, consisting of steam coils, gas burners, or electric elements. A corrosion-resistant coating called FF-1 is applied to all interior surfaces of the VS-800 model degreasers. In addition to 21 standard sizes in which this model is available, specials can be built to fit individual requirements.

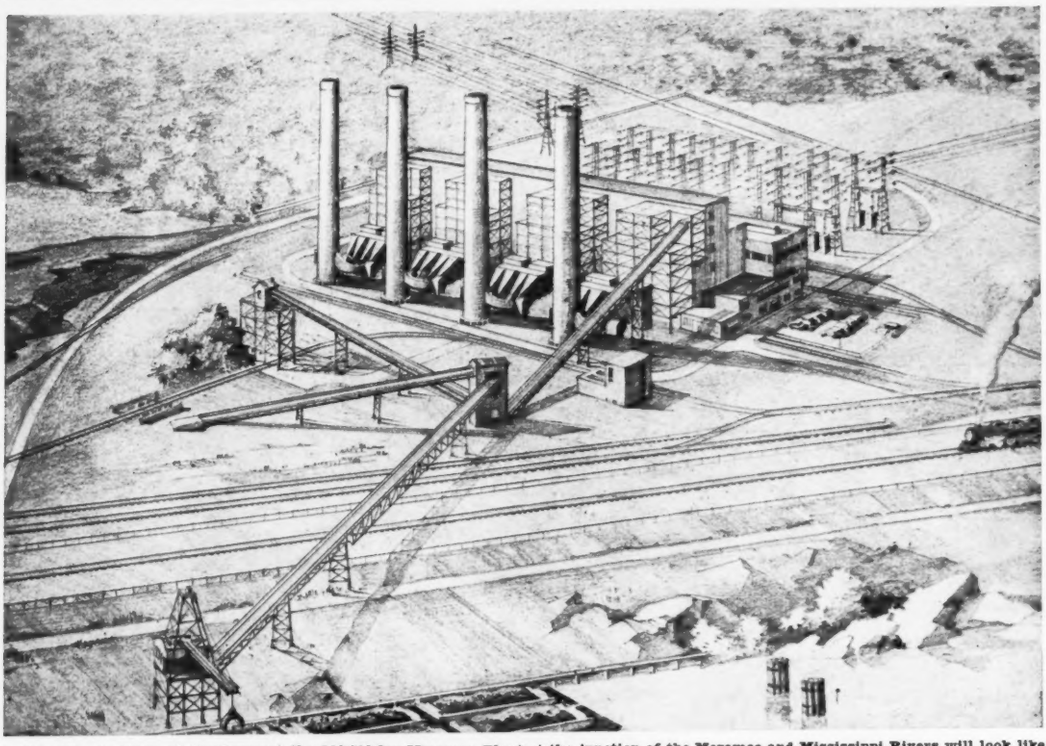
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 649.



Detrex solvent-vapor degreasers have been redesigned for greater compactness and simpler operation.

Standard Dredging Elects

Claude Cummins was recently elected Chairman of the Board of Standard Dredging Corp., New York, N. Y., and Leland E. Yeager succeeds him as President. William A. Campbell fills Mr. Yeager's former post of Executive Vice President and Rowan Cummins is First Vice President.



In its ultimate stage of development the 520,000-kw Meramec Plant at the junction of the Meramec and Mississippi Rivers will look like this. Construction of Unit No. 1 is described in this article. Unit 2 is expected to be on the line by the end of 1953.

POWER—
More Coming in Midwest

Huge 15-Year $500,000,000 Program to Boost Power Capacity In 3,800-Square-Mile Area; 520,000-Kw Plant Under Way

By RAYMOND P. DAY

(Photo on page 1)

Union Electric Co. and C. & E. M. Photos

Foundation design of the plant called for 649 H-beam piles to be driven into rock through a 90-foot layer of river sand and silt. A 50-ton Lima 802 crawler crane, with 60-foot leads, a 75-foot boom, and a Vulcan Size 0 hammer did the pile driving.

• PEOPLE who believe that all big things are a job for Government would find a trip to St. Louis enlightening. In that historical Missouri city on the banks of the Mississippi River, private enterprise is solving one of the most critical electric-power challenges ever met in the area. Union Electric Co. of Missouri is spending $500,000,000 in a 15-year program to meet predictable—and sometimes unpredictable—power demands.

Construction expenses are impressive indeed. In 1947 the company spent $25,100,000. In 1949, $36,000,000. In 1951, $35,500,000. What is that money buying? Kilowatts. Hundreds of thousands of kilowatts, in installations which boost capacity and lower generating prices.

What Creates a Power Demand?

Exactly what creates a power demand? Between 1947 and 1951, some 58,000 refrigerators were added in Union Electric's 3,800-square-mile area of Missouri and Illinois. There was a 53 per cent gain in electric ranges, a 65 per cent gain in water heaters, and more than 200,000 new television sets. In just one year 194 electric-panel-heating installations were thrown on the system. Commercial lighting intensity has jumped 4, 6, even 10 times what electrical engineers once thought adequate. There has been almost a 15 per cent increase in electric cooking and a 50 per cent increase in commercial air conditioning.

Meeting the Challenge

Union Electric is meeting this challenge. It formerly sold Illinois Power Co. some 150,000 kw. That load has now been reserved for Union Electric's customers, because Illinois Power Co. has built its own plants. Union Electric construction work added two 100,000 kw units at Venice No. 2 power plant in 1950. Two additional water wheels have been ordered for the hydro-electric installation at Bagnell Dam on the Osage River to give an increase in peaking-capacity reserve of 50,000 kw. By the end of 1953, Union Electric will have boosted its capacity from 825,000 to 1,400,000 kw—not including the Illinois Power Co. shift—and that is a 70 per cent increase in six years.

In 1947, company officials predicted that the load would double in 15 years. If you count the power shift from Illinois Power Co., there has been a 90 per cent increase in only 6 years.

Meramec Plant the Latest

The biggest item in the current construction program is a 520,000-kw plant at the junction of the Meramec and Mississippi Rivers. The initial work order called for construction of one 130,000-kw unit of an ultimate four identical installations. Later, in response to increasing power demand, Union Electric ordered construction to proceed on Unit No. 2, which is expected to be on the line by the end of 1953. United Engineers & Constructors, Inc., of Philadelphia, is acting as constructor on both units for Union Electric Co.

Plant Design

Structural design for the new plant was the work of Sverdrup & Parcel, Inc., with Ralph Shelton of Union Electric as Structural Engineer. The centralized control system which the plant features was the work of Union Electric engineers J. O. Steinman, W. G. Clover, D. L. Griesidieck, and I. F. Krughoff, with the assistance of a special committee.

Plant designers have eliminated every ounce of expensive, unnecessary falderal. The building, of reinforced

(Continued on next page)

concrete and structural steel, with Robertson Galbestos siding and precast-concrete slab roof, is simple but adequate. Money is being spent principally for the finest generating equipment obtainable, including two 100-ton cranes to serve the generating units.

Big Grading Project

The site at the Meramec and Mississippi Rivers is below the highest river stage on record; and it took 600,000 cubic yards of grading to get the plant area up out of the mud. A subcontract for the earthwork was let to Samuel Kraus Co.

Dirtwork consisted of excavating from a borrow area the required material, and placing it in lifts over the plant area. The broad, shallow borrow area will be used as a disposal spot for fly ash precipitated from the boilers.

Kraus used three 2-yard Lima draglines, 8 Euclid 13-yard bottom-dumps, 4 Caterpillar DW10's, and 5 LeTourneau Carryalls with auxiliary D8's for towing and push-loading. It was a straight dirt job, uncomplicated by anything but a wet summer which slowed down the operation somewhat. The earthwork puts about 18 feet of new dirt around the area. Ultimately, the area will blend in at the level of the various operating floors of the powerhouse.

The excavated material was hauled in, dumped, spread, and rolled principally by the tires of heavy equipment. Densities of 90 per cent (standard Proctor method) were required and obtained. The equipment was, of course, spread out so the Carryalls did the shortest-haul work, while the faster rubber-tired machines handled the longer hauls. Under no conditions did the haul exceed about 5,000 feet.

Pile Driving

The Meramec plant rests on a foundation of river sand and silt about 90 feet thick, above a formation of Warsaw shale and hard limestone. The foundation design called for 649 steel H-beams, 14-inch, 73-pound, each driven into rock to stand from 60 to 80 tons of loading. The piles were driven by a 50-ton Lima 802 crawler crane, which handled a set of 60-foot leads, a 75-foot boom, and a Vulcan Size 0 pile hammer. Steam was furnished by a small horizontal boiler.

Test borings preceded actual pile driving, but the rock ledge was generally flat, and pile lengths were all about the same. Sixty-foot H-beams were first set and driven almost to ground level. Then 30-foot top sections, with splice plates welded on, were set on top of the driven sections by a Lorain Moto-Crane or a small Manitowoc Speedcrane. The machines held the pile sections until they could be tack-welded enough to hold. Four Lincoln electric welding machines did the pile splicing.

In general, the piles drove easily for the first 50 feet or so. But after they had set for several days until the splices were made, driving was much harder from that point on down to bedrock.

Heavy Concrete Work

The powerhouse basement and foundation called for some heavy concrete work, especially in the turbine foundations.

All exposed concrete surfaces were formed by plywood facing nailed to 2 x 4 studs. A carpenter shop on the job has plenty of power saw equipment to speed panel construction. A Crescent woodworking saw, a DeWalt cutoff, and smaller electric saws are included.

The biggest and most intricate form in Unit No. 1 was the 13,500-square-foot turbine foundation enclosure. Turbine foundations consist of double cradles 89 feet 8 inches long, 28 feet 5 inches wide, and 36 feet high above the basement floor. There are 4 main columns of reinforced concrete for the turbine, and 4 similar columns for the generator, with a massive slab over the condenser tying the two together. All told, this one pour contains 900 cubic yards of concrete, 112 tons of heavy steel reinforcing, 170 anchor bolts, and 2 transverse anchors, as well as quantities of miscellaneous steel. Universal, Superior and Richmond form ties are all being used. On the first turbine-foundation pour, men placed the concrete in only 22 hours—8 hours less than scheduled.

Here workmen install reinforcing steel in a turbine foundation. These foundations are double cradles 89 feet 8 inches long, 28 feet 5 inches wide, and 36 feet high. There are 900 cubic yards of concrete in the big pour and 112 tons of heavy steel.

To supply the concrete, the St. Louis firm of Concrete, Inc., set up a batch plant at the site. Sand and aggregates were shipped in by rail, along with cement. The fresh concrete was mixed at the plant and transported by truck mixers, which acted as agitators, to the pours. Many of the pours were made by backing the truck mixers in and dumping direct. A Manitowoc Speedcrane and a Lima 802 crane handled Gar-Bro 1¾ and 2-yard concrete buckets to make the big turbine foundation pours.

The forms which enclosed the first turbine foundation were carefully numbered and marked, cleaned, and stored away where they could be re-used in making the second identical foundation pour. Even the 6 x 12 and 6 x 8 uprights which supported the upper slab were re-used.

Structural Steel Goes Up

One of the most spectacular phases of the project, from the standpoint of visible progress, was the erection of heavy structural-steel members in the building skeleton. About 2,700 tons of structural steel went into the first unit —1,891 tons in the boiler house, the bunker and heater bays; another 638 tons in the turbine room; and 170 tons in the office and service building.

The steel was fabricated and furnished on a joint basis by Mississippi Valley Structural Steel Co. and the Stupp Bros. Bridge & Iron Co. Ben Hur Construction Co., a subcontractor, did the erecting.

Two American stiffleg derricks set the various pieces. These derricks had 50-foot masts with 120-foot booms. Both machines had 2-drum American hoists, one powered by an electric motor and one by diesel. Floors below the

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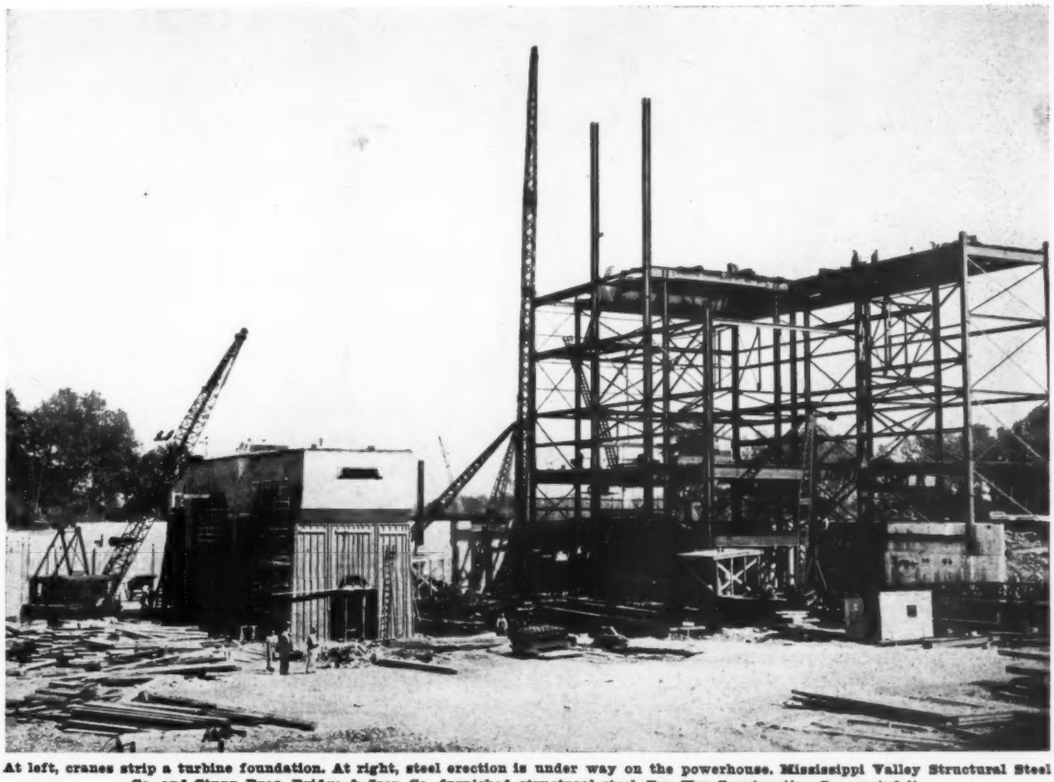


At left, cranes strip a turbine foundation. At right, steel erection is under way on the powerhouse. Mississippi Valley Structural Steel Co. and Stupp Bros. Bridge & Iron Co. furnished structural steel. Ben Hur Construction Co. erected it.

More Power Output Coming in Midwest

(Continued from preceding page)

riveting gang were planked solidly to prevent bad throws from burning men underneath.

Intake Structure Built

Perhaps the most difficult part of the job has been the construction of a reinforced-concrete intake structure down below the level of the Mississippi River. Massman Construction Co. is doing this work under another subcontract.

A rectangular block of solid rock, big enough to house the intake structures for all four ultimate units, has been blown out of the river by Massman, and the intake works for the first two units is being built under its subcontract. The big underwater excavation measures 53 x 166 feet, and goes down about 40 feet below the normal summertime level of the river.

Massman moved in a barge-mounted American Revolver crane with a 2-yard Owen extra-heavy rock bucket, a barge-mounted Dayton Dowell machine with a Hayward orange peel, two steel rock barges 30 x 120 feet, the towboat E. Frakes, and a drill barge.

Wagon drills were unsuccessful. So a Bucyrus Armstrong churn drill was brought in and mounted on the drill barge. Carrying a 7½-inch bit, it went to work drilling holes 11 feet, 11 feet 3 inches, and 15 feet center to center. Some of the holes were staggered to close the distances somewhat. The first drilling was done longitudinally with the long dimension of the excavation, for about half the area. The second-half drilling was done transversely, with the drill barge broadsided and hanging on its anchor lines.

Sixty per cent Du Pont special underwater gelatin cartridges were used to load the holes, which were cased temporarily with 8-inch pipe during drilling and loading. The holes were not sprung, but the powder was tamped heavily by a wood ramrod. Primacord detonating fuse then connected the holes of a shot, with the Primacord trunk line hooking to two No. 6 electric blasting caps. When a small hand-blasting machine set off the caps, the Primacord set off the high-energy wave which detonated the powder.

Broken rock from the excavation was removed by the two barge-mounted clamshells, loaded to barges, and dumped in a disposal area downstream near the shore. The excavation area had a bad tendency to sand in every night, so the work was necessarily slow. About 12 feet of rock was removed at the lower end of the block, and about 15 feet at the upper end of the block.

Union Electric Co. Photo

A Euclid bottom-dump unit delivers a load of excavation for fill at the site of the Meramec Plant. Samuel Kraus Co. subcontracted this dirtwork.

With the rock excavation complete, a big steel caisson, which St. Louis Shipbuilding Co. constructed, was delivered by water, spotted carefully, and checked and re-checked for position over the hole. Heavy steel pipes were driven through the spud wells in each of its four corners, to hold it straight as it went down. The 4-foot hollow steel walls were given a final check, and then men brought in the first concrete. A layer of concrete, which will form the foundation of the intake structure, was placed in the bottom of the caisson. Loading was evenly distributed so the caisson would sink level. Having reached the proper grade line, divers checked to make sure there was solid bearing all around the enclosure.

A seal course of concrete has been poured, the caisson cleaned out, and the remainder of the intake structure will be completed. The caisson will remain in place to form a steel shell around the concrete work. The big pipelines which hook on between the intake structure and the shore will then be laid, and the big 13 x 8-foot intake gates installed.

(Continued on next page)

Union Electric Co. Photo

Concrete crews place one of the outrigger piers for the powerhouse of Unit No. 1.

Personnel

Field operations for United Engineers & Constructors are being supervised by Construction Manager B. S. Thayer and Assistant Construction Manager G. H. Brown, with Fred Trainer as General Superintendent. For Union Electric Co., all operations are under the supervision of President J. W. McAfee. Other officials include R. E. Moody, Executive Vice-President, D. Sanford, Vice-President in Charge of Operations, E. L. Hough, Chief Engineer, C. H. Rulfs, Design Engineer, and J. A. McCampbell, Superintendent of Construction.

Dream Plant

The Meramec plant will be the *ne plus ultra* of mechanical engineering; combustion will be so efficient that 0.8 pound of coal will produce a kilowatt-hour of energy. Its site covers 374 acres, 180 of which will be occupied by buildings and equipment, railroad switch yards, coal-storage areas, and other related facilities. The power-plant building alone covers about 0.7 acre and is equivalent to a 12-story office building in height.

Centralized control, a trend throughout the power industry, is an important design feature. This means that all turbine, boiler, and electrical controls, indicating instruments, and recorders will be concentrated in one air-conditioned soundproofed room centrally located in the plant. Later, when the two final units are built, a second room will be constructed for their central operation.

Power units consist of single boiler-generator packages, independent of each other. The boilers, furnished by Combustion Engineering-Superheater, Inc., will tower as high as an 11-story building. They will furnish 925,000 pounds per hour of superheated steam at 1,250-pound pressure and 950-degree F temperature. The Westinghouse single-shaft turbogenerators will operate at 3,600 rpm and will be among the largest in the world, say plant designers.

The 230,000,000 gallons of water a day needed to serve the condensers of the first two units will be taken from the Mississippi River about 200 feet offshore. River barges will transport coal for the boilers from the Poplar Ridge Mine at Sturgis, Ky. Docks and other unloading facilities will be built on the Mississippi. A Link-Belt automatic conveyor system will transport the coal to the coal hoppers and storage areas. When the coal goes into the burners, it will have been pulverized as fine as cement. The river water will be used as is to condense expended steam for re-use as boiler water. Feed water will be cleaned, softened, and preheated before it enters the big boilers.

The fly-ash precipitators which will remove 97.5 per cent of the material from the stacks are the pride and joy of the plant designers. A year or so ago, collector efficiency of 95 per cent was considered exceptional, but ratings have gone higher with advancements in the design of electro-static precipitation.

Boiler-house arrangements were adjusted to take every advantage of these precipitators. Gas ducts, draft fans, and the dust collector have been placed on the ground in the yard, and the cleaned gas will be fed into a stack also at ground level.

(Concluded on next page)

C. & E. M. Photo

Massman Construction Co. is building the plant's RC intake structure below the level of the Mississippi River. Here the towboat E. Frakes slacks one of Massman's clamshells into position to dig after a blast.

More Power Output Coming in Midwest

(Continued from preceding page)

Other modern features include mechanical separation by V-type collection plates, increased density of the electrostatic flux field, and a new development of rapping collector plates. Plant efficiency is expected to be so high that there will never be any visible plume at the top of the stack, and only minute quantities of fly ash will remain in the stack.

Biggest Yet to Be Built

Impressive as the Meramec plant is, there is a bigger one now under construction. For Union Electric Co., along with four other utility companies, is about to tackle a 652,000-kw monster of a steam plant at Joppa, Ill., just across the river from the atomic-project site near Paducah, Ky.

The Atomic Energy Commission's Paducah plant will be the world's largest single consumer of electricity. To produce U-235 by gaseous diffusion, it will require about 1,000,000 kw of power. Private enterprise will furnish slightly more than half, while the TVA will furnish the remainder from a steam plant it now has under construction near Paducah.

Electric Energy, Inc., is the name of the private company which has been formed with the cooperation of Securities & Exchange Commission. Besides Union Electric, the firm includes Illinois Power Co., Central Illinois Public Service Co., Kentucky Utilities Co., and Middle South Utilities, Inc.

The plant will be a coal and gas-fired steam-generating station with the new, improved, outdoor-type construction. Coal will be supplied by rail and barge on the Ohio River. Unloading docks and facilities will be built on the river bank at the plant site which is one mile west of Joppa.

Throughout the United States, private utility companies are investing money in newer, bigger, and better plants to meet the ever-increasing demand for electric power. The expansion program of Union Electric is one example of the fact that private business is neither dead nor decadent.

C. & E. M. Photo

At left is Fred Trainer, General Superintendent for United Engineers & Constructors. He and Sam Kraus, excavation subcontractor, shake hands on a verbal deal about excavation at the new power-plant project in St. Louis.

Pump Bureau Chairman

R. D. Houghton, President of Rice Pump & Machine Co., Grafton, Wis., was elected Chairman of the Board of Directors of the Contractors Pump Bureau at its thirteenth annual meeting held recently. The Bureau, an affiliate of the Associated General Contractors of America, establishes and maintains technical standards subscribed to by 14 manufacturing members.

Data on Concrete-Pipe Forms

A 26-page catalog issued by Quinn Wire & Iron Works, Boone, Iowa, describes and illustrates concrete-pipe forms and pipe machinery. It lists several models of culvert and manhole forms in addition to the standard, medium and heavy-duty types. Tables give recommended sizes of pipe and reinforcement for culverts and sewers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 571.

Riddell Sales Personnel

Garth N. Elmore and Leslie R. Davis were recently appointed district sales representatives of W. A. Riddell Corp., Bucyrus, Ohio, manufacturer of Warco motor graders. Mr. Elmore, who handles the territory of Michigan, Illinois, Indiana, Kentucky, West Virginia, and Ohio has held previous positions with manufacturers of heavy-duty earth-moving equipment. Mr. Davis takes care of the states of Wisconsin, Iowa, Minnesota, Nebraska, North Dakota, and South Dakota. He was formerly with Athey Products Corp. in a sales and engineering capacity.

Trench-side pipe jointing enabled J. & S. Galier Co., builder of Cleveland's Solinski and Puritas Road Playgrounds, to put 14-foot pipe units into the trench at a time. Here, a workman installs Tru-Line Spring Clips which hold Bosco perforated plain-end pipe lengths together.

Trench-Side Jointing Speeds Pipe Laying

Jointing pipe lengths outside the trench saved considerable time for J. & S. Galier Co., Cleveland, Ohio, contracting firm, on Solinski and Puritas Road playground projects in Cleveland.

To steady the pipe for jointing, Galier made temporary cradles by nailing wooden strips to the edges of long planks and placing straps under the pipe at the ends and center. When the sections had been jointed with Bosco spring clips, three men lowered the 14-foot sections into the trench.

The playgrounds are part of Cleveland's Recreation Bond Project, which provides parks and playgrounds for school children. Solinski playground is a 3-acre tract, and Puritas Road development covers 25 acres in the southwestern part of the city. More than 12,000 feet of Bosco perforated plain-end pipe and spring clips, products of The Bowerston Shale Co., Bowerston, Ohio, were used on the projects.

Plastic-Coated Gloves

Plastic-coated canvas gloves which protect against water, acids, alkaline materials, oils, and corrosive chemicals have been placed on the market by Houghton Laboratories, Inc., Olean, N.Y. Coated with abrasion-resistant vinyl plastisol, they are said to remain flexible at temperatures from freezing to as high as 200 degrees F. Either smooth or rough finish is furnished, in knit, safety-cuff, or gauntlet-cuff styles.

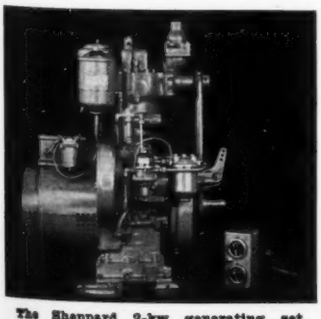
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 599.

New Generating Set

A 2-kw lightweight generating set is announced by R. H. Sheppard Co., Inc., Hanover, Pa. It supplies 2,000 watts at 1,800 rpm and has models operating on ac or dc current and all standard voltages.

The entire unit weighs 395 pounds and is powered by a single-cylinder Sheppard diesel engine. A radiator with tank or heat exchanger provides cooling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 585.



The Sheppard 2-kw generating set supplies 2,000 watts at 1,800 rpm. It weighs 395 pounds.

Detroit Automotive Ups Two

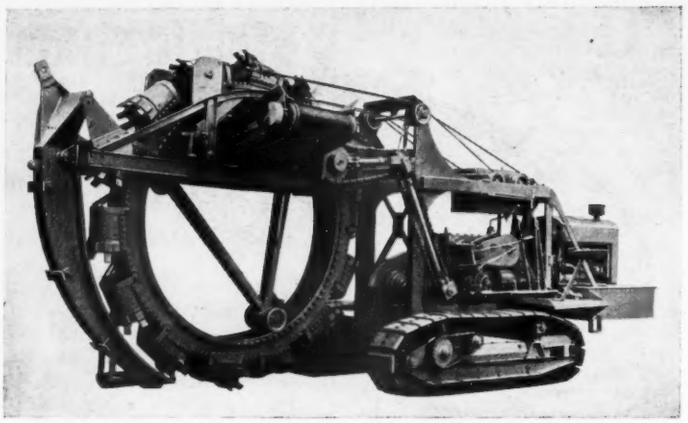
Two recent promotions in Detroit Automotive Products Corp., Detroit, Mich., manufacturer of NoSpin differentials, Load-Booster third axles, and Thornton four-rear-wheel drives for trucks, concern I. M. Hagglund and G. W. Pollard. Mr. Hagglund is Manager of the Sales Department, and Mr. Pollard is Service Manager. Mr. Hagglund has been with the company in various capacities for the past twelve years. Mr. Pollard joined Detroit Automotive a year ago and since that time has worked in the company's Service Department.

Wheel-Type Trencher

Full-scale production on two new Trenchliners is announced by Parsons Co., Box 431, Newton, Iowa. Both are wheel-type fully crawler-mounted machines. Model 202 is designed primarily for drainage and utility trenching, and Model 215 for pipeline work.

With a choice of either 52-hp gasoline or 55-hp diesel engine, the Model 202 can dig in 30 separate feeds from 6.2 inches to 18.5 feet per minute, and in 9 widths from 13 to 31 inches wide and 6 feet deep. Features include friction clutch control of the digging wheel, easily changed bucket-fronts with cutting lips, and a shiftable and reversible belt conveyor for discharging spoil on either side of the machine. With either 16 or 20-inch treads, the Model 202 has a ground bearing pressure of 5 to 6 psi. For laying drainage tile, a special box and chute are available as optional equipment.

Model 215 has several features designed for "mile-a-day" production on cross-country pipeline installations: six digging-wheel speeds up to 11.2 rpm, standard tractor-type crawlers with lug-type shoes, 18-inch treads, and choice of two 55-hp diesel engines.



The Model 202 Trenchliner for drainage and utility trenching can dig in 30 separate feeds and 9 widths. A Model 215 for pipeline work has also been announced.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 607.

NCA Annual Meeting

The National Constructors Association, New York, N. Y., has had as its chief aim throughout its existence the search for greater cost stability in the construction of plants for the chemical, petroleum, and steel industries, said J. F. Pritchard, Kansas City, Mo., retiring President of the Association, at its annual meeting in January. The organization, which operates on a national and international scale, is composed of leading building and engineering firms engaged in the construction of plant facilities for the industries mentioned.

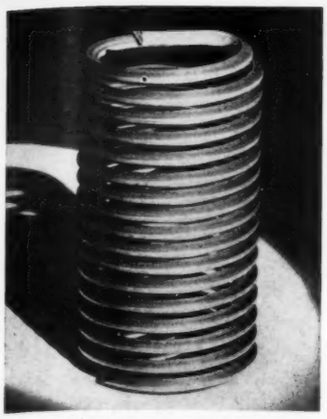
The retiring President, in reviewing the Association's work during 1951, remarked on its considerable success in eliminating jurisdictional disputes, and consequent work stoppages, among various trade unions. He revealed that the construction of plant facilities with either a direct or indirect bearing on the mobilization program forms by far the greater part of the work at present being undertaken by the Association's members. Both Government and private contracts are included in this work. He also disclosed that field employment by member companies is now at its highest point since the immediate postwar period. Seasonal drops in employment, common during winter weather conditions, have affected employment to a lesser degree than in former years.

The Association elected as its new President J. J. O'Donnell, The Lummus Co., and as its Vice President, C. D. Haxby, The Rust Engineering Co. Members of the Executive Committee are S. F. Spangler, Chemical Construction Corp.; E. D. Hoekstra, The H. K. Ferguson Co.; C. B. Whyte, Procon Inc.; T. C. Williams, Stone & Webster Engineering Corp.; and J. S. Fluor, The Fluor Corp., Ltd. Chairman of the Labor Committee is L. T. Gardiner, The Fluor Corp., Ltd., with J. F. O'Neill, Chemical Construction Corp., and R. C. Siciliano, Procon, Inc., as Vice Chairman. Chairman of the Foreign Committee is W. Q. Ashley, Foster Wheeler Corp.; and the Safety Committee Chairman is F. R. Griffin, Koppers Co., Inc.

Fairbanks, Morse Personnel

There have been several changes in the sales organization of Fairbanks, Morse & Co., Chicago, Ill. Included are the following appointments: General Sales Manager—J. A. Cuneo, former Manager of the Chicago branch; Chicago Branch Manager—Milo C. Roy, former Manager of the Omaha branch; Omaha Branch Manager—J. W. Wright, former Diesel Sales Division Manager; Manager of the Diesel Sales Division—C. E. Dietle, former Diesel Department Manager of the Chicago branch; Atlanta Branch Manager—W. B. Wylly, former Manager of the Houston, Texas, sub-branch. L. A. Weom, former Manager of the St. Louis branch, is transferred to St. Paul, where he takes over the duties of Branch Manager succeeding A. C. Thompson, who has retired. Clifford J. Schroeer, former Diesel Department Manager of the St. Louis branch, succeeds Mr. Weom as St. Louis Branch Manager.

A further announcement from Fairbanks, Morse concerns an autonomous operation for two of the company's divisions, Electrical and Scale. This involves the following changes: General Manager of the Electrical Division—Gordon R. Anderson, former Manager of the Freeport works; Sales Manager of the Electrical Division—W. H. Kingsley. Both offices remain in Freeport, Ill. General Manager of the Scale Division is George C. Worthley, former Manager of that division; Sales Manager of the Scale Division is Joe Peterson. Mr. Worthley will have charge of both sales and manufacturing, and both his and Mr. Peterson's offices will remain in Chicago.



Heli-Coil inserts are precision-formed coils of 18-8 stainless steel wire. They restore damaged tapped threads to original sizes and contours.

How to Fix Damaged Threads in Equipment

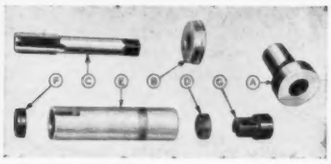
Helical-Wire Thread Inserts Restore Damaged Tapped Threads to Their Original Size and Contour

•HERE'S an idea for the swipe file of mechanics in your repair shop. Damaged tapped threads in the engines, bodies, or working parts of your construction equipment can be repaired quickly and permanently with helical-wire thread inserts. They are coils of precision-formed 18-8 stainless-steel wire having diamond-shaped cross sections. When installed, they provide threads that conform to the American National Series of thread contours. They can be installed with either hand or power tools.

Take, for example, the salvage of tractor-engine cylinder heads. The inserts can be used to repair threads damaged when the screw-in type precombustion chambers seize as they are removed from the cylinder-head casting. The procedure is as follows.

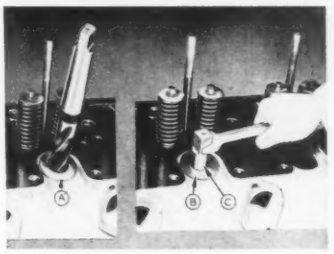
Here's How

Remove the precombustion chamber from the block, take off the gasket, and clean the seat. Insert a drill guide (marked A in the accompanying photos) into the precombustion-chamber opening of the head, making sure that the bottom of it is properly seated in the gasket counterbore. Cut the new hole just beyond the outside diameter of the old thread. After the hole is cleaned out, remove the drill guide and clean the shavings from the opening with an air blast.



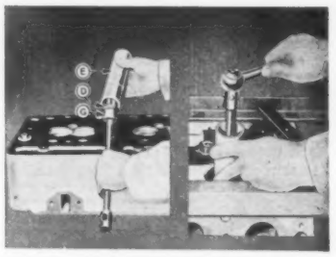
This is the thread-repair equipment Caterpillar specifies for salvage of its tractor-engine cylinder heads with Heli-Coil inserts. A—drill guide; B—tap guide; C—Heli-Coil tap; D—Heli-Coil insert; E—sleeve assembly; F—thread-insert prewinder; G—installation nib for drive wrench.

Now cut new female threads into the hole to receive the external threads of the insert. Place the tap guide (see B) over the shank of the tap (C) and position it in the cylinder head. After the tap and tapping guide are removed, again clear the hole of chips.



The drill guide (A) maintains hole concentricity as damaged threads in this precombustion-chamber casting are drilled out. The tap (C) held in position by the tap guide (B) prepares the hole for the Heli-Coil thread insert.

The hole is now ready for installation of the Heli-Coil thread insert. Select the proper size of prewinder (F) and place it in the counterbored section of the sleeve assembly (E). Make sure the hole in the prewinder is aligned with the pin on the leaf spring and that its smaller diameter is outside of the body. Select the proper nib (G) to



The thread insert (D) is assembled in the nib (G), inserted into the sleeve assembly (E), and turned into the prewinder. At right, the prewinder is pressed flush against the casting, over the hole, and turned clockwise until resistance disappears.

(Concluded on next page)

How to Fix Damaged Threads in Equipment

(Continued from preceding page)

accommodate the particular size of thread insert being installed, and attach it to a ½-inch-square wrench extension. Place the thread insert (D) on the nib so that its inserting tang engages the slot in the nib and faces the mouth of the slot. Hold the drive wrench upright so that the insert will stay on the nib. Slide the nib and the insert into the assembly (E) until the insert rests against the prewinder, and rotate the drive wrench clockwise with a slight forward pressure until the insert is wound into the prewinder. This takes three or four turns.

Next, press the prewinding assembly down firmly against the work and turn the insert into the hole until turning resistance disappears. The lack of resistance indicates that the thread insert is positioned properly one-quarter to one-half turn below the surface of the casting.

When repairing through holes, the inserting tang on the Heli-Coil must be broken off. Remove it with pliers or, in the case of smaller sizes of thread inserts, with tang break-off tools. When inserts are installed in blind holes the tang need not be removed.

Function of Prewinder

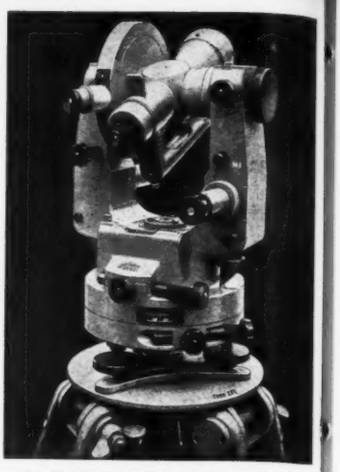
The free diameters of helical-wire thread inserts are slightly larger than the holes into which they are inserted. The prewinding device reduces the free diameter of the coil to slightly less than that of the tapped receiving threads before it is turned into the hole. Once in place in the hole and released from the tool, the insert expands against the female receiving threads (because of its spring-like action) and automatically locks itself in place. Neither vibration nor bolt turning can dislodge it, though it can be removed by hand with a special tool.

Incidentally, the inserting tool described in this example is designed for rapid thread repairs on a semiproduction scale. The operation is much simpler for occasional repairs, since drill and tap guides are not necessary and standard inserting tools may be used.

More About the Inserts

Heli-Coil Corp. of Danbury, Conn., makes these inserts, and says they are stronger and more resistant to wear, corrosion, and heat than the threads they replace. In their installed positions they have internal threads that conform to National Bureau of Standards specifications. Standard sizes are from 6-40 to 1½-12 in the National Fine Thread Series and from 4-40 to 1½-6 in the National Coarse Thread Series in 1, 1½, and 2-diameter lengths are available. Longer lengths are available for special applications; the inserts also come in spark-plug and pipe thread sizes.

Help insure America's security and your own. Buy U. S. Defense Bonds.



The Breithaupt No. 30 theodolite for third-order surveying has an accuracy of one second on both vertical and horizontal work.

German Theodolite For Higher Surveying

A precision theodolite for third-order surveying is announced by Columbia Technical Corp., 5 E. 57th St., New York 22, N. Y. Useful in tunnel construction, the Breithaupt No. 30 weighs 11½ pounds and is said to have an accuracy of 1 second on both vertical and horizontal work. All circles and parts are protected against dust and moisture.

Readings can be made from one point in front of the instrument, and slow-motion, focusing, and clamping screws are at the right side to free the observer's left hand for holding notebooks and sketches. The telescope aperture is 40 mm, and the magnification is 30 x.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 611.

Rotary Core Drill Bits

Bits for concrete-core drills are described in literature available from Tilden Tool Mfg. Co., 209 Los Molinos, San Clemente, Calif. They range in size from 3/16 to 4-in diameters, and their construction, operation, and features are clearly outlined in the bulletin. A price list is included for the various standard sizes available.

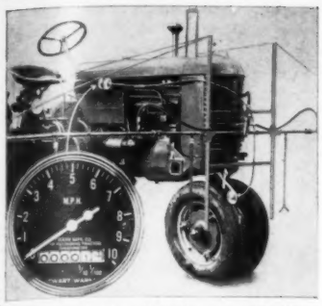
The company reports that the Tilden Konkrete Kore drill will cut 300 inches of concrete without resharpening. It may be resharpened by the owner or serviced by the company without charge. The bits also fit any ordinary electric or rotary drill.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 650.

Labrador Railroad Filmed

A color movie depicting construction of the Labrador Railroad and iron-ore development work in northeastern Canada has been released by Armco Drainage & Metal Products, Inc., Middletown, Ohio. It is a 16-mm silent film, which runs for about 30 minutes. Complete with maps and titles, it takes the viewer on an adventurous air and Jeep trip over the desolate country between Seven Islands on the Gulf of St. Lawrence and Knob Lake in Labrador, site of rich deposits of iron ore. The picture illustrates and describes all aspects of the construction work done during 1951 and includes some memorable "human interest" shots.

The company recommends the film for showing to small engineering groups of 30 to 40, college students, luncheon clubs, and for other organization programs. To make arrangements for booking it, apply to the nearest division office of Armco Drainage & Metal Products, Inc., or write directly to the company in Middletown, Ohio.



The Frank speedometer records the speed and mileage of wheel tractors as a check on gasoline consumption as well as travel speeds.

Records Speed, Miles Traveled by Tractor

A recording speedometer for wheeled equipment is made by Frank Mfg. Co., Mentone, Ind. Calibrated from 1 to 10 mph, the unit is suited for tractor operations that require accurate recording of both speed and distance. Gasoline consumption and road speeds can be checked this way.

It registers speeds within 2 per cent of the reading at 10 mph through a temperature range of zero to 110 degrees F, and maintains this accuracy throughout its life, claims the company. The distance is registered in tenths and hundredths of miles as well as miles. The unit includes a clock with attaching clamp, cable, travel wheel, and assembly with mounting support bracket. It is guaranteed against damage to either the clock mechanism or its accuracy up to a speed of 30 mph. The clock mechanism is guaranteed against defective material or workmanship for 90 days or 4,000 miles, whichever occurs first.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 580.

Plastic Computers Speed Pipe Layout

Two computers for on-the-job pipe layout are made by Interstate Sales Co., 123 E. 18th St., New York 3, N. Y. Their Vinylite plastic pointers are designed to give accurate readings under any weather conditions.

The computer gives direct readings for any angle of bend up to 126 degrees, in steps of one degree or less, on pipe diameters from one inch to 20 inches. Complete angles of two-piece or multi-piece bends and Y-layouts are read on the computer and transferred to the actual pipe, sheet metal, template, or drawing board. The circle divider reads circumference divisions from ½ to 1/16 inch for any circle up to 72 inches in diameter.

A folding computer for field use and a flat type for the shop are available. Both measure 12 inches square flat and the field model is 12 x 4½ inches folded.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 587.

Two instruments for pipe layout: the computer, top, gives direct readings for any angle of bend up to 126 degrees on diameters from 1 to 20 inches; the circle divider, bottom, gives instant reading of circumference divisions from ½ to 1/16 inch for circles up to 72 inches in diameter.

Construction Products

A 24-page pocket-size booklet on construction and industrial products has been prepared by The Flintkote Co., Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y. The "Digest" is a guide to specific as well as custom-formulated asphalt emulsions and cutbacks; asphalt, rubber, and resin adhesives; coatings and sealers. It is designed to help in the selection of flooring products, protective coatings, and paving materials.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 658.

Motorola Division Moves

The Communications and Electronics Division of Motorola, Inc., has been moved from the company's headquarters at 4545 W. Augusta Blvd., Chicago, to 4501 W. Augusta Blvd. The 10-year-old building provides 200,000 square feet of plant and office space. It has been renovated to consolidate all activities of the Division—two-way mobile and fixed-station radio, microwave relay, and carrier-control engineering, production, and sales. There are approximately 1,000 people employed in the plant.

Data on Standardization

"Standardization—Key to Economy" is the title of a 16-page booklet issued by Caterpillar Tractor Co., Peoria 8, Ill. It points out that the company is able to maintain an economical high-volume manufacture of both prime products and replacement parts by building diesel engines common to the Caterpillar line of track-type and wheel tractors, motor graders, and power units. The booklet also shows how standardization helps conserve critical materials.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 560.

New Chemical Sprays For Roadside Control

Two new chemical mixtures for killing brush and woody plants have been developed by Thompson Chemicals Corp., 3028 Locust St., St. Louis 3, Mo. Bramblcide is used on poison-ivy and brush areas, and Bramble-Weedicide attacks woody-type weeds.

Thompson, which conducts research on its own grounds and makes tests along right-of-ways, reports that chemical brush control with 2,4-D and 2,4,5-T esters costs from one-half to one-seventh as much as cutting or bulldozing, and that second-year spraying is usually cheaper than first-year. It suggests chemical clearance on a 12-month basis, using foliage spray in spring and summer and basal-stem treatment during the fall and winter. Although the latter method has proved successful, the company points out that spraying the entire tree during the dormant period is not effective.

Bramblcide contains 4 pounds of pentyl ester of 2,4,5-T acid per gallon in an emulsifiable base. Bramble-Weedicide contains a mixture of 2,4-D and 2,4,5-T low-volatile esters. Both compounds are formulated with creeping and spreading agents and will emulsify with either oil or water. Their low-surface tension causes rapid spread over the leaf surface, and their low polarity permits absorption through the plant cuticle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 634.

Disston Promotes Dingee

John H. Dingee, former Advertising and Sales Promotion Manager of Henry Disston & Sons, Inc., Philadelphia, Pa., manufacturer of saws, tools, and special-alloy steels, is the new Sales Manager of the company's Power Tool Division. He succeeds William P. Gillespie, who has become Sales Manager of the Hardware Division. Mr. Dingee joined Disston in 1947.

Road Is Protected From Beach Erosion

Highway Crew Lays Asphalt Slope Paving and Mortar-Bag Ramp to Maintain Ocean-Front Road in South Carolina

By WILLIAM H. QUIRK,
Eastern Editor

• IN an effort to repair damage and check erosion along State Route 174 on Edisto Island, maintenance forces of the South Carolina State Highway Department are employing asphalt slope paving. The beach at Edisto Island is one of the finest on the South Carolina coast, but in recent years erosion has been severe. Storms and high seas have washed away many beach homes, and in places where the state highway closely parallels the coast, as much as half the pavement width has been lost.

The existing highway consisted of a 57-foot blacktop surface bordered by concrete curbing. The outer curbing was lost, along with a major portion of the pavement, because of erosion. To hold the beach in place, groins were constructed extending out into the ocean. They were of two lengths, 100 and 300 feet approximately, the long ones spaced 600 feet apart, and the short ones on 200-foot centers. With the groins in position, the Highway Department began work in February, 1951, on the 3,500 feet of highway that had been damaged. Maintenance operations were scheduled for completion by the end of last year.

Two Types of Protection

First of all, the full 57-foot width of roadbed was built up to its original 8.0 elevation with sand from the beach. An Insley ½-yard dragline cast up the material, which was leveled off and shaped by a Caterpillar Thirty-Five tractor-dozer. Then work began on the protection of the slopes leading from the road down to the beach.

In the area where the beach was somewhat flatter in slope because of the accretion of sand along the longer groins, the sideslope highway protection consisted of a mortar-bag ramp about 1,500 feet in length. For the remaining 2,000 feet of highway along the shorter groins, where the slope to the beach was somewhat steeper, a thick layer of asphalt was laid over the sand.

The burlap bags forming the ramp along the eastern end of the beach were filled with four parts of sand to one part of cement. Sand from a pit in nearby Edisto Beach State Park was used for the aggregate, while bag cement was supplied by the Pennsylvania Dixie Cement Corp., Atlanta, Ga. A CMC mixer set up on the beach mixed dry batches consisting of four bags of sand to one bag of cement. The contents of a single batch were distributed into eight burlap bags. The fact that the bags were only partially filled made them easier to handle and made them pack better in the ramp.

(Continued on next page)

C. & E. M. Photo

A CMC 2-bag mixer, set up on the beach of Edisto Island, S. C., mixes dry batches of sand and cement in the proportion of 4:1.

Road Is Protected From Beach Erosion

(Continued from preceding page)

A toe trench, 4 feet deep x 3 feet wide, was first dug by the dragline and backfilled with the sand-cement bags, which were continued up the slope. The pitch on a typical slope at this end of the beach was 2 to 1, with the average width and height 10 and 5 feet respectively. Bags were placed so that they overlapped about two-thirds of their width in ascending the ramp, thus giving a shingle effect. As each section of ramp was completed, the bags were wet down with water pumped from the ocean at high tide. A 2-inch centrifugal pump, hooked up to a pipeline running into the sea, supplied an adequate stream of water to harden the bags of mortar, thus forming a solid protecting ramp.

Hot-Mix Plant

To furnish the hot-mix for the slope paving and road surfacing, the maintenance forces set up a portable Hetherington-Berner asphalt plant. It was located at a sand pit at the rear of Edisto Beach State Park, and a haul road was graded out to the state highway. Average haul to the beach front was 3 miles. Sand for the aggregate was dug from the pit by a Hough 1-yard Payloader, which ran up a ramp to charge the plant receiving hopper.

C. & E. M. Photo

A Hough Payloader, which has run up a ramp from the sand pit where it dug sand for the aggregate, dumps 1 yard of sand into the plant hopper.

From the hopper a feeder moved the sand to a 22-foot-high cold elevator that dropped the fine aggregate into a dryer, 3½ feet in diameter x 12 feet long. The dryer was fired by two burners using No. 2 fuel oil. A 22-foot hot elevator raised the heated sand to a triple-deck vibrating screen, 4 feet square, equipped with ½-inch, ¼-inch, and No. 4 sieves. Oversize material that did not pass the ¼-inch sieve, along with trash, branches, roots, etc., was collected into a waste hopper which was emptied once a day. The selected material went into the plant sand hopper, and from there to the weigh bucket and pugmill.

Asphalt with a 60 to 70 penetration was supplied for the mix by the Esso Standard Oil Co. at Charleston, S. C. It was picked up there in the highway department 2,265-gallon Etnyre asphalt-transport tank mounted on a Chevrolet truck, and hauled 53 miles to the plant site. The asphalt was put into the transport tank at a 200-degree temperature. It was further heated in the tank so that when it was pumped into the plant the temperature ranged between 300 and 350 degrees F.

High Asphalt Content

A Deming 3-inch asphalt pump, powered by a Ford V-8 85-hp gas engine, pumped the bitumen from the transport tank into the 400-gallon asphalt tank on the plant. As no great volume of material was required for this project, unlike a mass-production straight paving job, the services of a boiler with necessary water supply were dispensed with. In its remote location, the plant also did without a dust collector. Standard equipment included a 265-gallon tank for fuel oil on the plant, with two other fuel tanks alongside holding 270 and 500 gallons each. A single Allis-Chalmers 75-hp gasoline engine furnished direct drive power to run the plant.

The transport tank, of course, was stationed at the plant while it was supplying the asphalt. At the start, fuel oil in the tank was blown to the burners by a "charge" of compressed air from a Handi-Air tank at a working pressure of 150 pounds. Batches of sand and asphalt were mixed 1½ minutes, then discharged into two trucks—a Chevrolet and a Dodge—that hauled the material to the highway. Trucks held 15 batches or about 5 tons. The plant had a capacity of 8 to 12 tons per hour, depending upon the amount of moisture in the sand and the rate at which it passed through the dryer.

The mix for the slope paving had a high asphalt content with 8 per cent bitumen. A typical batch weighing 674 pounds contained 620 pounds of sand and 54 pounds of asphalt. For the highway paving, the mix contained a maximum of 4½ per cent asphalt, a typical 650-pound batch containing 620 pounds of sand and 30 pounds of asphalt.

Paving the Slopes

From the edge of the roadway the two hauling trucks end-dumped the plant-mix material down the slopes. Men with rakes and shovels pulled the

(Continued on next page)

C. & E. M. Photo

A portable Hetherington-Berner asphalt plant furnishes hot mix for S. C. State Route 174. In the background is a 2,265-gallon Etnyre asphalt-transport tank.

C. & E. M. Photo

A Model K Allis-Chalmers tractor pushes a roller up and down the slopes to compact them. The 1-ton iron roller is fastened by a long tongue to the tractor.

asphalt to the bottom, spreading it in a layer 7 to 8 inches thick. This lift was compacted with hand tampers from the bottom to the top of slope. Then more asphalt was added, increasing the depth of slope paving to 15 inches when compacted. Compaction was achieved with a 1-ton iron roller fastened with a long tongue to a Model K Allis-Chalmers tractor. The tractor worked along the beach, pushing the roller up and down the slopes. Slopes averaged 16 to 18 feet in length.

Sand was then dozed back along the toe of slope to a depth of about 4 feet above the bottom of the paving. It is believed that with the new groins as beach protection, the sand will be held in place and always kept well above the toe of highway slope. Thus while storms and high seas may on occasion roll water up the beach and even over the road, the asphalt protection should prevent any undermining of the roadbed as in the past. The very soft mix of 8 per cent asphalt will give with the pounding of the surf, but is not expected to break, as would a leaner and more brittle mix.

Following the slope work, the highway was paved with a single 4-inch course of the sand-asphalt 4½ per cent mix. The sides of the existing pavement were coated with hot asphalt to make a good bond. Because of the irregular outline of the damaged surface, the new paving was done by hand rather than by machine. It was compacted with the 1-ton roller pulled by a truck. Later the plant-mix was topped with a 2-inch course of an RC-2 cold-mix for the full width of replaced pavement. This surfacing was a mixed-in-place job done with motor graders.

Groin Experiment

A landward extension about 100 feet long to one of the 300-foot groins was covered with the soft, high-bitumen-content plant-mix, as an experiment to see whether the asphalt, acting as a cushion, will prolong the life of the timber barrier and make future repairs unnecessary. The job was done at low tide. The timber was encased in the mix, which is about 3 feet wide on the top, with sideslopes at the rate of 1½ to 1. The mix extends 4 to 5 feet into the sand.

Personnel

The maintenance crew on the beach-

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Road Is Protected From Beach Erosion

(Continued from preceding page)

erosion project totaled 23 men, of whom 6 were stationed at the asphalt plant and the remaining 17 worked on the highway. Henry Sauls was Foreman on the work, and A. G. Kent was Plant Foreman. The work was performed under the general supervision of officials of Engineering District No. 6, with headquarters at Summerville. District Engineer is A. A. Muckenfuss. Resident Maintenance Engineer M. L. Murph, Jr., is the Department's local representative. He was in direct charge of the work.

The South Carolina State Highway Department is headed by Claude R. McMillan, Chief Highway Commissioner, with S. N. Pearman, State Highway Engineer. W. K. Beckham is Maintenance Engineer.

Slotted-Leg Angle For Easy Fabrication

A slotted-leg galvanized-steel angle for fabricating scaffolds, ladders, assembly tables, machine guards, and similar equipment is available in limited supply from Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

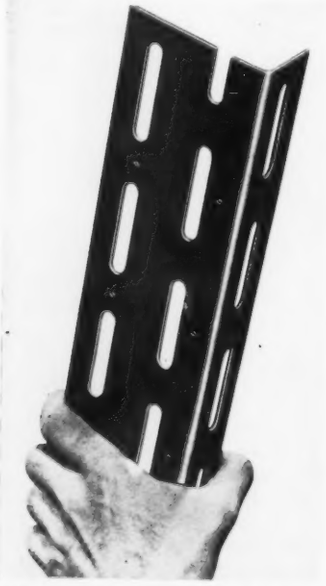
DexAngle is 3 x 1.5 x 0.08 inches in section and comes in 10-foot lengths. A hacksaw will cut any desired piece, and a wrench is used to tighten bolts. The company points out that drilling and welding are unnecessary, as are special brackets, braces, clips, and hooks.

Auxiliary components such as panels and casters give the assembled equipment a wider versatility. Steel panels, 36 x 6 inches with 1-inch flanges, provide shelving that will support loads up to 300 pounds per panel. Ball-bearing casters applied to DexAngle make bins, carts, and hand trucks portable.

When used as uprights in lengths up to 5½ feet, these angles will individually support loads as high as 1,200 pounds. Longer lengths than this require bracing or assembly as composite sections for satisfactory load values. C-channels, T-sections, Z-sections, I-sections, and box sections can be made from DexAngle. When assembled in this manner, loads as high as 4,000 pounds are possible. When used horizontally, concentrated loads from 90 to 3,800 pounds can be supported.

DexAngle is sold by the package. Each package contains ten 10-foot lengths of angle and 75 bolts and nuts. Shipping weight is approximately 110 pounds. Shelving panels are available in packages of 12, with 24 bolts and nuts. Caster assemblies are packed four to a package.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 626.



Three rows of staggered slots in DexAngle fabricating units permit rapid assembly by bolting. Diamond-shaped indentations simplify measuring and cutting operations.

Telsmith Promotes Three

Smith Engineering Works, Milwaukee, Wis., manufacturer of the Telsmith line of machinery for contractors, quarries, and gravel pits, recently announced three changes in its executive staff. Donald D. Barnes, formerly Executive Vice President, is now President and Treasurer in succession to the late Charles F. Smith. Gerald L. Smith, formerly Vice President and Director of Sales, is Executive Vice President and Director of Sales. Thomas S. Smith is Vice President. The new President, Mr. Barnes, has been with Telsmith since 1919.

Cold-Weather Starting

A booklet describing a method of starting engines in cold weather is available from The California Oil Co., 350 Fifth Ave., New York, N. Y. Chevron starting fluid in 7 and 17-cubic-centimeter gelatin capsules is used with a special puncturing tool and priming system permanently connected to the intake manifold system of the engine. After the capsule is punctured, the fluid is pumped to the cylinders, where its low ignition temperature, wide inflammability range and high volatility permit combustion at temperatures as low as 50 degrees below zero, the company claims.

This literature on Chevron may be obtained from the company, or by using the Request Card at page 16. Circle No. 641.

Hobart Bros.' new gasoline-engine-driven arc welder—stationary or trailer-mounted—has its control panel located on the generator end. The large hand wheel and field rheostat within control the 1,000 combinations of welding current.

Arc-Welder Controls Are Easy to Reach

A gasoline-engine-driven arc welder with the control panel conveniently mounted on the generator end is announced by Hobart Bros. Co., Hobart Square, Troy, Ohio. Generator controls, meters, welding and ground-cable terminals, polarity switch, ignition switch, starter button, oil-pressure gage, battery ammeter, and the receptacle for 1-kw auxiliary power, are centrally located on the panel for easy adjustment.

The generator is symmetrical, with 4 removable laminated main poles and 4 interpoles. Patented single-unit brush rigging holds the generator and exciter brushes in a fixed neutral position.

The 1,000 combinations of welding current and open-circuit voltage are controlled by a large wheel and field rheostat within. The ten main steps or ranges are selected by means of a heavy copper switch, molded in Bakelite and operated by the large hand wheel. The rheostat provides 100 steps of fine adjustment in each of the ten main ranges.

Prompt building up of voltage and freedom from accidental polarity reversal are assured by a special, oversize, inbuilt, 4-pole exciter, which can supply dc current in excess of that required to excite the welding generator. This excess 110-volt power can be used to operate lights and tools.

The generator is powered by a Chrysler engine and includes a standard battery-type ignition, charger, and starting motor. Engine speed is controlled by a constant-speed fly-ball-type governor, operated by a V-belt from a separate pulley on the engine crankshaft. An idling device is provided to save fuel as well as wear and tear on the outfit. It slows the engine down when the arc is broken and brings it up to operating speed when the arc is started. A mercury-type time-delay switch allows sufficient time to change electrodes without slowing down the engine.

The entire unit is enclosed in a weatherproof steel canopy with piano-hinged side panels that can be padlocked in place if desired. This new gasoline-engine-driven welder is available in a stationary model or mounted on a pneumatic-tired 4-wheel trailer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 563.

O'Donnell Joins Bullard

Paul W. O'Donnell is the newly appointed Industrial Relations Manager of E. D. Bullard Co., San Francisco, Calif., manufacturer of industrial safety equipment and clothing. He comes to Bullard with fifteen years' experience in safety problems, acquired through working with Protective Equipment, Inc., Chicago, and will maintain temporary headquarters in Chicago, with a permanent address to be announced later.

Booklet on Rock Breaking

Breaking mass concrete or rock without blasting is the subject of a new 4-page folder describing the Duncan hydraulic Roc-Jak. Photographs and sketches show how the jack is set in a 2-foot drilled hole where its ten hard-steel pistons are expanded hydraulically to break the rock.

This literature may be secured from the K. O. Duncan Co., 1350 Wright St., Los Angeles 15, Calif., or use the Request Card at page 16. Circle No. 558.

Bulletin on Power Takeoff

A bulletin on a power takeoff for trucks with standard transmission is issued by Mobile Power, Inc., 3020 E. Grand Blvd., Detroit 2, Mich. The Tangen Power Drive is installed as an integral part of the transmission, and makes available 97 per cent of the engine power for auxiliary power purposes.

Power is transmitted through the main drive gear in the transmission, but the installation in no way affects the standard driving mechanism. When the vehicle is in motion, a governor maintains the desired output of the power drive. The booklet illustrates how the unit is applied to trucks for operating arc welders, pumps, compressors, cement mixers, saws, and other power tools.

This literature on the Tangen Power Drive may be obtained from the company, or by using the Request Card at page 16. Circle No. 567.

AGC of Minnesota Convenes

At the 33rd Annual Convention of the Associated General Contractors of Minnesota held on January 10 through 12 in Minneapolis, a serious note was struck in discussing the problems which face the state's construction industry in 1952. An attendance of over 400 heard that the new restrictions being put into effect by the Defense Production Administrator will prohibit any new starts in the second quarter for commercial and industrial construction, and NPA officials look for little improvement until the beginning of 1953.

Highlights of the three-day convention were a discussion by building contractors of the labor supply, including the training of bricklayer apprentices and carpenters; and a panel discussion on the probable demand by unions for record-breaking wage increases. W. H. Tusler, Minneapolis, Regional Director of the AIA, delivered an address on contractor and architect cooperation. Architect John Magney in an address to builders said that "modular magic" may cut building costs about 10 per cent.

Colonel A. C. Welling, Chief of the Army Engineers organization training division, said that of 76 units formed, 3 battalions were sponsored by the AGC of Minnesota—two in the Twin Cities and one on the Iron Range. Dean M. Schweickhard, Chairman of the Governor's Advisory Committee on Construction Controls, reported on the Committee's deliberations to increase construction in the state in 1952. J. D. Marshall, Washington, Assistant Managing Director of the AGC of America, predicted a drop of $2 billion in general construction in the United States this year. T. L. Roswell, Assistant Director of the Office of Education's Requirements Division, addressed the meeting on school construction.

As regards highway construction, G. W. Price, Manager of the Minnesota Trunk Highway Federation, warned that if constitutional amendment No. 5 is passed the state will lose almost $9,000,000 in funds for highway construction. M. J. Hoffmann, Commissioner of Highways, said that the State Highway Department plans to spend $28,700,000 on highways this year if materials and help are available. Highway contractors heard a panel discussion on "Highway Program Controls Problems".

Safety awards were presented to several firms. In the below-average man-hour exposure group: Gene Hurley Construction Co., St. Paul; M. E. Souther Construction Co., St. Paul; and August Cederstrand Co., Minneapolis. In the above-average man-hour exposure group: Sauers Construction Co., St. Paul; Madsen Construction Co., Minneapolis; and James Leck Co., Minneapolis. Winston Bros. Co., Minneapolis, and Herbert Reese, Greenbush, received special awards for safety records earned in previous years.

Social events of the convention included the annual banquet on January 12, attended by 700 people; and the annual stag party on January 10, featuring a stage show of radio and television stars.

Officers of the AGC of Minnesota, elected at the convention, are as follows: President, George F. Cook, in succession to John Dieseth; Vice President of the Builders' Division, A. H. Baumeister; Vice President of the Highway Division, J. D. Meland; Vice President, Heavy Division, J. R. Howes; Secretary-Treasurer, H. V. Burnett. Chapter Manager is R. J. Hendershott. Three-year-term directors were elected as follows: A. H. Baumeister, S. R. Okes, and H. P. Phelps. Hold-over directors are H. V. Burnett, George F. Cook, J. D. Meland, George Heller, J. R. Howes, and John Dieseth. Directors whose terms have expired are G. T. Maloy, R. A. Shelgren, and M. E. Souther.

Steel-Mesh Firm Expands

The William F. Klemp Co., 6644 S. Melvina Ave., Chicago, Ill., completed a $300,000 expansion program at the end of last year. Klemp, which manufactures structural-steel footwalks, open steel bridge decking, grating, treads, Hexteel and Floorsteel surface armors, Flexteel conveyor belting, and steel mats and meshes of various types, has added 50 per cent extra floor space to its Chicago plant, as well as a new forge-welded-grating assembly line. The company plans an additional expansion this year, at an approximate cost of $500,000.

Pocket-Size Technical Books

Release of its 1952 catalog of pocket-size technical data books has been announced by Lefax Publishers, Philadelphia 7, Pa. Over 2000 subjects are listed, covering every known branch of engineering. Each handy looseleaf book contains approximately 140 pages of reference material and can be carried in the pocket for convenient reference on the job.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 582.

Diamond Iron Elects Blaul

J. P. Blaul is the newly elected President of Diamond Iron Works, Inc., Minneapolis, Minn., manufacturer of rock-crushing and processing equipment. Mr. Blaul, who joined Diamond Iron early in 1951, succeeds L. J. Reay, who has resigned as President but will continue to serve as a member of the board of directors.

Portrait in Print
By BILL QUIRK

Big Paving Man From Little R. I.

• "YOU might say we've been dumb for three generations for sticking to the contracting business", said the tall heavy-set man as he watched the blacktop pavement taking shape. But from the twinkle in his eye and the ready smile of big Jim Lynch of Providence, Rhode Island, you knew he was content to be doing just what he was doing—and what his father and grandfather had been doing before him. Keep to the present tense, however, when speaking of Jim's father, for James H. Lynch at 77 is still very much of an active force in James H. Lynch & Co., paving contractor of Providence, R. I. "He is not only the president but also the 'and company' ", said Jim, who still calls his father "the boss".

Curiously enough, perhaps from an added measure of Irish independence in his makeup, Jim heads up his own firm—the Sealdrok Paving Co. of Berkeley, R. I.—with headquarters in a suburb of the state capital. Father and son are thus apparently in competition with each other, but more often they join forces to help one another out with a loan of equipment or an exchange of ideas. A year ago last fall, for instance, when Jim's company was laying the blacktop pavement for the access road to the North Central State Airport at Smithfield, R. I., the elder Lynch was helpfully on hand with a suggestion here and there, and furnished some added paving equipment for completing the rush job before the cold weather set in.

Jim's grandfather on his mother's side was Dan Grady, who also was a paving contractor. He came out of Sligo County, Ireland, to Boston, and from there made his way to Providence. In those days the block-paved streets of New England cities and towns were laid by English, Irish, and Scotch artisans who made a significant contribution to America with their skills acquired in the old world. Jim's father went to work for Dan Grady, became a superintendent, and eventually married the boss' daughter. Jim was their only child.

Into Construction

Jim Lynch received his education at LaSalle Academy and Providence College, from which he graduated with a bachelor's degree in liberal arts. Now 48, he stands 6 feet 2 and tips the scales at a hefty 240 pounds. Although something of a football player in high school, Jim's flair for books was stronger than his interest in athletics, and today he is widely read and informed in a variety of fields. He is an affable extrovert, a raconteur par excellence with a gusty sense of humor, and is gifted with a genial charm which makes friends readily. It is not surprising that this paving contractor was also elected alderman in Providence for several terms of office. Lynch is well known far beyond his native New England.

After graduating from college, Jim picked up the rudiments of construction by working a few years for his father, who had gone into the contracting business for himself when Dan Grady died. After that he got a job as assistant superintendent on duct-line and underground-utility installation for J. T. Cuddy Co., a Providence contracting firm. When the depression of the early thirties practically halted private construction, young Lynch was glad to take a job as foreman of a paving crew for the Providence City Highway Department. He had married in 1929, and was on his way to raising a family which now includes four boys and three girls, ranging in age from six to twenty-one. "That foreman job was eating-money at the time", reflected big Jim Lynch puffing on a cigar, "and I also learned a lot about paving that was useful later on."

Despite the economic slump the country was in, technical progress was being made in the road-building industry by private interests. Patented bituminous pavements, such as Dr. Amies' Amiesite, were still in their heyday, and competition was keen. Another leading pioneer in this field was Hiram M. Stafford, formerly of the Barber Asphalt Co., who patented a type of pavement called Sealdrok in which the aggregate was heated to the expansible limits, and then coated with a special bituminous compound. This precoating process was developed to frostproof the aggregate and seal off the moisture which always has been the bane of paving experts. It was laid as a semihot mix around 160 to 180 degrees F.

Becomes a Contractor

Numerous Sealdrok plants had sprung up across the eastern half of the country, and Stafford was looking for someone to manage a plant that his company, American Sealdrok, Inc., was installing in the Providence area. He heard of Jim Lynch and picked him for the spot. Sealdrok processing was done in a 2-ton pugmill-type asphalt plant located alongside a quarry in Berkeley. Jim handled the plant from 1937 to

(Continued on next page)

C. & E. M. Photo

Jim Lynch (James H. Lynch, Jr.) is President of Sealdrok Paving Co., Berkeley, R. I. Bituminous pavements are his contracting specialty.

This Big Paving Man Hails from Little R. I.

(Continued from preceding page)

1940, when B. J. Kirk leased it from the original company but asked Jim to stay on and continue to supervise its management.

In 1946, Lynch and Edmund J. Ryan purchased the plant and operated it as a partnership until the death of Ryan in 1947, when Jim bought out the other interest. The name Sealdrok went along with the purchase—also the privilege of turning out the patented paving material without payment of royalties. Once he owned the plant, Lynch became a contractor as well as a producer of paving material, and began operating as the Sealdrok Paving Co.

Besides Rhode Island, the company does business in the neighboring states of Massachusetts and Connecticut. Although his father constructs both cement-concrete and bituminous pavements, Jim confines his contracting solely to bituminous pavements made with either asphalt or tar. The work is both public and private. The public contracts cover town and state projects, while the private work, much larger in volume, includes clients owning anything from industrial plants to race tracks.

Sealdrok Paving Co. is not a large contracting firm, but it has managed to keep busy. Lynch feels that if you can't make a living in Providence you would starve anywhere else. Although Rhode Island is the smallest state in size, it is one of the most intensively industrialized areas in the world. Textile plants in particular are spread out along the streams, reaching from city to town to village as one community blends into another with no recognizable boundary lines, so close together are they. These plants, for instance, turn up a surprisingly large number of paving jobs such as yard improvements, parking lots, access roads, etc. Lynch's organization is small enough and flexible enough to move quickly around from one job to another with a minimum of waste motion.

The Blacktop Rose

Over the years big Jim Lynch has seen some odd results from his bituminous work. There was the time one hot summer when, after completing a blacktop pavement on a parking lot, he got an indignant phone call from his client. "Something must be wrong with this pavement", roared the parking-lot owner. "It's so thin that a rosebush burst through it." Jim hustled down to the parking lot and sure enough, off in a corner of the pavement was a small bush bearing a single rose.

"Look at that", the client yelled. "A rosebush!"

"What did you expect at my low price?" asked Jim. "A maple tree?" The man smiled in spite of himself. Jim then went on to mollify the worried customer, assuring him that the pavement was neither so thin nor so soft as to permit a bush to push its way through. What had happened was that a rose seed had been blown into the aggregate pile at the asphalt plant, and the heat of the dryer had started the germination process. The layer of bituminous pavement had proved to be a suitable seedbed.

"Had the same thing happen to me once with milkweed", Lynch affirmed. "The wind had deposited some pods in the sand pit at the plant, and the aggregate dryer had stimulated their growth. It was a strange sight to see milkweed growing out of a blacktop pavement."

Chicken Every Sunday

Another rather unusual sight at the contractor's yard is a flock of over 200 chickens which Jim Lynch raises as a hobby. He got into this pursuit as a boy, naturally enough, since the state is the home of the famous Rhode Island Red breed. Jim, however, raises Asiatic fowls—light Brahmas and Cochins—that are characterized by heavy leg and foot feathers. These are meat or table breeds, weighing up to 12 pounds, and the only chicken, according to Jim, from whose backsides you can cut sandwich meat.

Probably the most unusual of Jim Lynch's tales is the one he tells of a remarkable WPA production effort on a paving job. Not many kind words have been said of Works Progress Administration employees, and rarely have they been praised for the amount of work they performed.

"We were supplying the plant-mix for a street-paving project", Jim recalled, "which was being laid by a WPA crew. It was a cool morning in the fall of the year, and 11 of our trucks were loaded early at the plant

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C. & E. M. Photo

James H. Lynch, Sr., with his son Big Jim. Each runs his own contracting firm, but mutual help is more in evidence than competition.

for hauling the mix to the job site. In no time at all, it seemed, we got a phone call from the foreman that he needed more trucks, that all the material had been dumped and spread.

"This was unbelievable, so I hurried to the street under construction. To divide the work among as many as possible, no mechanical spreaders or finishers were permitted on a WPA job. The foreman, a fellow they called 'Bull' Pepper, had split his big gang up into three groups. Each group worked 20 minutes out of every hour. 'Bull' had a watch and a whistle, and when a 20-minute shift was up he blew the whistle and yelled, 'Come on, you bulls, get in there and work.' The crew turned their rakes and shovels over to the next gang and production never lagged. In nine hours we trucked in 424 tons of blacktop which was spread as fast as the trucks dumped it.

"I think the secret of the good production was that after standing around in the cold for 40 minutes, those fellows were eager to work 20 minutes at top speed with the hot-mix just to get warm. I don't know whatever happened to 'Bull' Pepper. He would make a darn good superintendent for some contractor."

Aid to Foreign Teams Wins ECA Honor for BTEA

In the last two years the Building Trades Employers' Association of New York City has made its facilities available to various groups of building-construction teams brought to the United States from England and other western European countries by the Economic Cooperation Administration in conjunction with the Anglo-American Council on Productivity.

In recognition of BTEA's contribution, ECA has presented the Association with a Certificate of Cooperation, honoring it for "furnishing technical assistance to the peoples of the Marshall Plan countries to aid them in maintaining individual liberty, free institutions, and peace". The citation accompanying the certificate refers to it as a token of gratitude and appreciation for the Association's work in giving foreign visitors a better understanding of the United States economy and a new indication of how they may build up the defensive strength of their countries. "Generous and understanding aid such as you have given", concludes the citation, "is helping to make the Production Assistance Program a powerful factor in the strengthening of western Europe."

Centric Increases Output

By the end of last year Centric Clutch Co., of Woodbridge (formerly of Cranford), N. J., manufacturer of Rawson centrifugal clutch couplings, had completed a program to enlarge production space. Since March, 1951, the company has been operating from its new building on Main Street and State Route 35, Woodbridge. An extra 10,000 square feet of floor space has enabled it to maintain a 100 per cent increase in production personnel, with the necessary equipment, as well as to build up a substantial stock reserve.

Three different drives are offered with the Rocket 4½-yard concrete mixer.

New 4½-Yard Mixer

A 4½-yard revolving-drum type of concrete mixer is announced by Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis, Mo. It is offered with a power-takeoff drive operating with a pump and motor, a straight takeoff, or a separate engine drive. A special feature is the hydraulic-lift swing chute at the rear of the truck.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 623.

Oklahoma City Builds Second Sewage Plant

City's Expansion Program Includes 10-MGD Activated-Sludge Sewage-Treatment Plant; Eliminates Pollution Threat

• WHEN residents of Oklahoma City want municipal improvements, they have a way of voting the bonds and getting things done. Streets, roads, air-terminal facilities, outfall sewers, and sewage-treatment units are being built as fast as the city grows.

The latest example of a determined community in action is Northside Sewage Treatment Plant, a 10-mgd installation which Earl W. Baker & Co. of Bethany, Okla., recently completed for the City Water Department at a cost of $1,440,000. This treatment plant, which can be expanded easily if population or industrial requirements make it necessary, is near Lincoln Park in the northeastern part of the city, on the site of a former plant of obsolete design. The Baker contracting organization had previously built a 25-mgd plant on the south side of Oklahoma City. Together, the two installations will modernize the city's sewage-treatment facilities and eliminate stream pollution for many years.

Designed by Consultant

The Northside plant was designed by the Oklahoma City consulting-engineer firm of Benham Engineering Co. Four years ago, the city fathers pulled a wise piece of purchasing and spent $228,813.50 for the machinery in the Northside plant, so that it was available when needed. The design incorporated this equipment in the plant.

Designed for an effluent BOD (biochemical oxygen demand) rating of 20, the plant separates the solids by settling chambers and aeration. The aeration process also purifies the water, and while the plant is equipped for chlorination of the return activated sludge if necessary, no chlorine installation for final effluent was contemplated under the Baker contract.

The plant consists of an inlet and bypass structure, grit chamber, 2 comminutors, 3 primary settling tanks, 8 aeration tanks, an operating gallery, return-sludge well, 4 final clarifiers, an outfall headwall structure, 2 primary and 2 secondary digesters, and 20 sludge-drying beds.

Digesters are 70 feet in diameter, and have 8-inch reinforced-concrete walls and a gas-tight concrete dome roof. They were prestressed by steel wires applied with an initial stress of 140,000 psi; the design stress was 100,000 psi. Spacing of the prestressing wires varied from 37 wires per foot at the bottom of the digesters to 12 wires at the top. Preload Corp. of Kansas City, Mo., had the subcontract for this work.

The 3 primary settling tanks are 33 x 85 feet, with 12-inch reinforced-concrete walls. The administration building is a conventional low yellow-brick structure in the central part of the plant. The 8 aeration tanks are 31 x 140, with 14-inch end walls and sidewalls battered from 18 to 12 inches in thickness. The 4 final clarifiers are 70 feet in diameter, with 12-inch walls. The sludge beds measure 25 x 100 feet.

Principal equipment in the plant bears the names of several manufacturers. Digester and clarifier machinery was supplied by Dorr Co. Primary-settling-tank equipment is all Link-Belt. Chicago Pump Co. furnished the comminutors and pumps. One of the modern features is the use of Worthington engines, which burn digester gas, to drive Sutorbilt blowers which furnish the air for the aeration process.

The City has made arrangements for the sale of sludge-bed material to the Soil Booster Co. of Oklahoma City. This company takes the material and runs it through a final grinding and screening process before shipment. A great deal of the valuable organic material has been sold in Oklahoma, Kansas, and New Mexico. As a fertilizer, it has about 4 per cent of available nitrogen. Wherever it has been used around Oklahoma City, engineers report it has done wonders for the soil.

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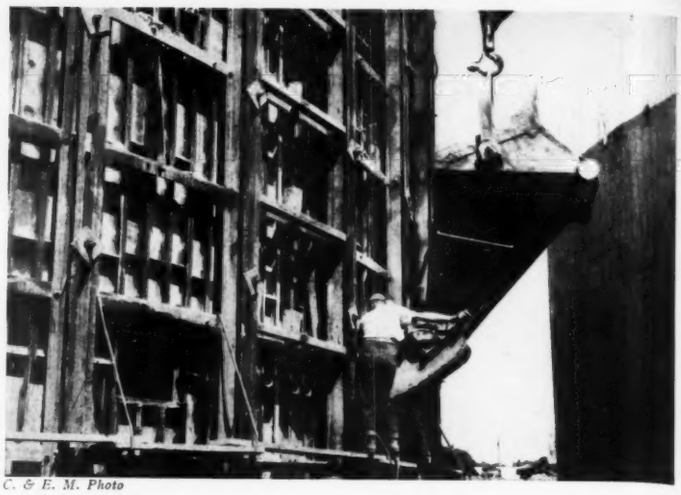


C. & E. M. Photo

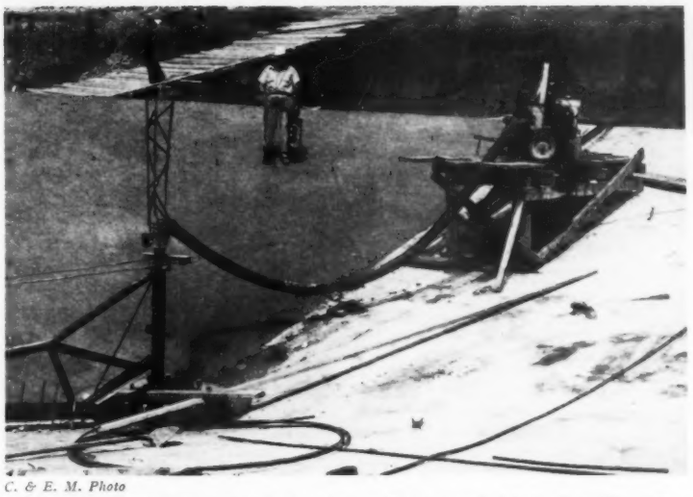
An Insley laydown-type bucket transfers concrete to a digester pour at the Northside Sewage Treatment Plant in Oklahoma City. Men wrestle with it at the lower row of doors in the forms. Earl W. Baker & Co., Bethany, Okla., was the contractor.

Water-Logged Excavation

From a construction superintendent's point of view, the plant was interesting from start to finish. Its site is mostly red clay, with scarcely any permeable formations. Excessive rains would have turned the material into a quagmire if the various operations had not been perfectly synchronized.

George McGuire, the Superintendent, is a red-faced Irishman whose construction history goes back 40 years, and most of the problems he met on this job he had already solved somewhere else: Prado Dam, in California; ordnance plants in Nebraska and Kansas; a tough pipeline crossing of the Canadian River; or the Southside Treatment Plant, which he also built. McGuire tried to balance his excavation progress with uncertain deliveries of reinforcing steel. The result was that excavation didn't have to rush too much to stay ahead of concrete work.

The excavation layout was not pretentious. McGuire used three Northwest draglines: two 80's and a 6. One of the 80's with a 2½-yard dragline bucket threw the dirt out to a spoil pile, where an Allis-Chalmers HD-19 and a 20-yard Gar Wood scraper picked it up and delivered it around the site. Most of the excavated dirt was used to raise the level of the low treatment-plant area.



C. & E. M. Photo

On the Oklahoma City sewage-plant project—a Novo pump had to work continuously to keep the area under the digesters dry. Here it is hooked onto a graveled-in well under the floor and is sucking in water from all around.

Heavy spring rains in the Oklahoma City area slowed dirtwork and made McGuire gamble on dewatering equipment. Six Novo and Jaeger pumps, from 2 to 4-inch, were used. A French-type dewatering well was dug under the digesters, and one of the pumps, working more or less continuously, kept that area dry. The other pumps were spotted strategically over the work area.

Forms and Concrete

Exposed concrete in the plant has a pleasing architectural effect. Both wood and steel forms were used. Enough Irvington steel panels were ordered to form one quadrant of a digester. These forms were handled by one of the Northwest cranes, adjusted by surveyor's instruments, and tied together with high-tensile-steel bolts. The forms had two rows of doors, through which the fresh concrete was placed and vibrated.

Intricate wooden forms, with plywood facing nailed to conventional 2 x 4 studs, were made in a fully equipped central carpenter shop. Power-saw equipment there included cutoffs, table saws, and portable units. This shop also fabricated, for shipment, some of the forms to be used on a building job in Louisiana.

The Northside plant is in an unfavorable location with respect to rail delivery of concrete materials, so a new Noble plant purchased for the Southside job was used at that site. Aggregates and sand were shipped in to the batch plant from commercial sources, and bulk cement was trucked in. The plant was a fully automatic type, located 4 miles away and across the city from the construction project. Three 3-batch Ford trucks and a Ford-F8-mounted Fruehauf batch trailer truck delivered the dry-batched material to the job. The latter machine hauled 4 batches.

A MultiFoote 34-E paver did the concrete mixing. Water came in from a pressure line connected to the paver by a flexible hose. The mix was a 6-sack batch, with Pozzolith added at the paver skip. Compressive strengths of this mix ran in excess of 3,000 pounds in 28 days.

As a general rule, all mixed concrete was transferred to the pour by a Northwest crane and concrete buckets. An Insley laydown-type bucket worked satisfactorily on the digester walls. It could be spotted accurately at the various doors, and handled just as efficiently in topping out the 30-foot-high pours. There were a Worthington compressor and several Chicago Pneumatic internal-type vibrators for the consolidation of concrete. Hunt Process curing membrane was sprayed on by a small orchard-type spray.

Considerable backfill had to be placed around the concrete structures. Where possible, sheepsfoot rollers were used; small pneumatic tampers did the job in the tight places.

Automatic Welders

The piping installation job was so extensive that the contractor's organization resorted to automatic welding on part of it. For some time automatic welding has been used on buildup of tractor rollers and so on, so the welders were not without experience when they approached the piping.

The welding equipment was mounted on a truck for easy portability. There was a Unionmelt head, with two 400-amp Lincoln machines. Unionmelt wire was used for all automatic welding, while Fleetweld 85 was used for the

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Oklahoma City Builds Second Sewage Plant

(Continued from preceding page)

manual jointing of pipe sections.

When wear on dragline bucket teeth is bad, Baker's men have an efficient way of hard-facing. They run three close beads of Stoody Tube Borium to cover the edge of the tooth. Then they run close beads of Stoody Self-Hardening at right angles to the tip, to resist wear.

Considerable welding was also done to tack embedded metal items in place during concrete pours.

Personnel

The Northside Treatment Plant is under the general direction of M. B. Cunningham, Superintendent and Engineer of the Oklahoma City Water Department. Col. W. L. Benham heads up the engineering organization which bears his name.

For the contractor, George McGuire was in charge as Superintendent, with Charles J. Craft as Assistant Superintendent. Other key men included Project Engineer Herbert Hudson and Concrete Foreman Tom Gannon.

C. & E. M. Photo

Men on the job, left to right: A. W. Fritz, Dragline Operator; W. F. Caldwell, Inspector; George McGuire, Superintendent; Tom Gannon, Concrete Forman; Herb Hudson, Project Engineer; C. J. Craft, Assistant Superintendent.

Completion of the Northside plant in December, 1951, brought to residents of northeast Oklahoma City a full return on the money commitment they voted in the 1950 bond election. Progressive and courageous, these people have accepted their responsibility and saddled themselves with the task of financing new facilities.

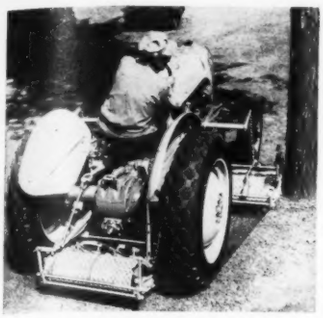
1951 Breaks All Records On Pennsylvania Turnpike

Fourteen million dollars collected from 7,500,000 vehicles was the grand total for 1951 on the Pennsylvania Turnpike, according to Thomas J. Evans, Chairman of the Turnpike Commission.

Breaking down these figures, which far exceeded the Commission's expectations, Mr. Evans gave the following details: The 109-mile Philadelphia Extension from Carlisle to Valley Forge increased the mile length by 63.2 per cent, while traffic on the system during 1951 showed an increase of 66.3 per cent over the previous year. Stimulated by the Philadelphia Extension, the toll increase represented a 54.9 per cent boost over 1950 revenue. Vehicles entering the Turnpike through interchanges on the newly opened 67-mile Western Extension averaged 6,600 daily for the first six days of operation at the end of December. During the year approximately 802,500,000 miles were traveled by the 7,500,000 fare-paying vehicles together with nonrevenue vehicles such as police, maintenance, supervisory, and service. The peak month in 1951 was August, when 934,000 vehicles paid more than $1,500,000 in tolls—a daily average of over $50,000.

The Pennsylvania Turnpike System stretches 327 miles from the suburbs of Philadelphia in the east to the Ohio state line in the west. Eventually, it is planned, the Turnpike will connect with the following highways: the nearly completed New Jersey Turnpike; the superhighway being readied for construction in Ohio; a northeastern extension which will run from a point east of Harrisburg on the present system to the New York state line between the Susquehanna and Delaware Rivers.

The passenger-car toll fare on the Pennsylvania Turnpike is slightly less than a cent a mile. Other fares vary according to the distance traveled and the type of vehicle, and range from $2.20 for motorcycles to $20.50 for the heaviest trucks, with full trailers, traveling the entire length.



As you can see, the Park Challenger mower for attachment on Ford tractors cuts within 3 inches of trees.

Roller-Drive Mower Cuts Ahead of Wheel

A roller-drive mower for attachment on a Ford tractor is manufactured by Roseman Mower Corp., 2610 Ridge Road, Evanston, Ill. The Park Challenger has three 30-inch units, one in front of each rear wheel and one in back between the wheels. This arrangement gives the operator full view of the 7-foot swath, affords better control, and eliminates tractor wheel marks, according to the company.

The mower can overhang curbs without dropping off, thus avoiding injury to the reel and bed knife. A hydraulic lift raises the three units 10 inches off the ground during travel. The mower is said to have good maneuverability and to be able to cut within 3 inches of trees and other obstructions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 589.

New Line of Blowers For Suction Cleaning

A line of portable electric blowers for cleaning motors, machines, and places that can't be reached by hand or compressed air has been developed by The Ace Co., 112 W. Washington St., P. O. Box 1212, Ocala, Fla. The blowers may be used for light and heavy-duty work and are equipped with universal motors supplying from 100 to 275 volts.

All models have painted aluminum castings, sealed ball bearings, 3-wire rubber-covered cord, and grounded housings. Suction and spray attachments are optional.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 608.

New Emergency Light

An emergency light which comes on automatically when regular power fails is manufactured by General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. The GS No. 16 clamps onto a standard 6 or 7½-volt dry battery, and supplies 21 candle power in any direction. Used with either ac or dc current, the unit is self-contained and portable.

The GS No. 16 emergency light, powered by a dry battery, comes on automatically when regular power fails.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 698.

Protects Asphalt Paving

A 4-page bulletin is available on Solac, a coal-tar-pitch emulsion used to protect asphalt paving against gasoline, oil, and other destructive agents, and to waterproof concrete. Issued by Lancaster Chemical Corp., 9 Rockefeller Plaza, New York 20, N. Y., the bulletin suggests specifications, cites characteristics, and lists the applications of the emulsion.

This literature may be obtained from the company by requesting Bulletin No. 3, or by using the Request Card at page 16. Circle No. 632.

A Record for Competition

May we call your attention to an advertisement on page 53 which C&E Monthly is happy to publish in cooperation with National Business Publications, Inc., as a public service. It points out that the U. S., with only 6 per cent of the world's population, now produces 50 per cent of the world's steel. That U. S. steel output in 1950 was 1,292 pounds per person, while the rest of the world's was 97. That U. S. output grew 83.4 per cent between 1939 and 1950, while the rest of the world's fell off 0.8 per cent.

The ad cites this record not to boast but rather to document a philosophy: "The competitive system delivers the most to the greatest number of people."

Other ads in this Progress for People series will appear in future issues

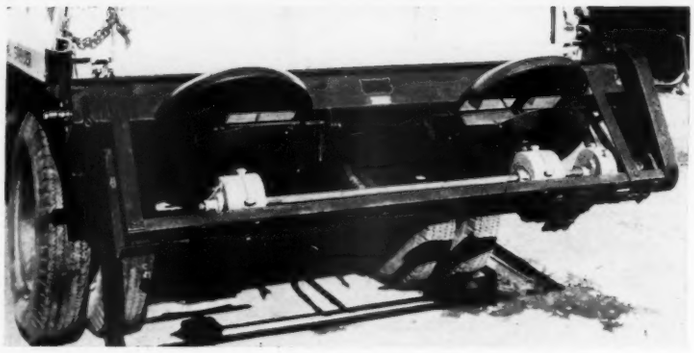
Tail-Gate Spreader Operated From Cab

An automatic, hydraulically operated material spreader which can be mounted on any dump body up to 96 inches wide is manufactured by Central Engineering Co., Inc., 4429 W. State St., Milwaukee 8, Wis. The Hydro-Spreader can be controlled by one man and will spread 9 to 35 feet wide at speeds up to 30 mph. Closing gates actuated by a lever in the cab of the truck start or stop the spreading.

The material falls from the body into a 7-inch-wide hopper where a screw-type agitator feeds it to the adjustable discharge ports. Here it drops to 21-inch spinner disks which spray it out along the required swath. The size of the discharge-port openings controls the width and direction of spread. Both disks and agitator receive power from a hydraulic pump near the power take-off.

Shields protect the spinner disks when material is dumped over the spreader. The company claims that the unit can be mounted or removed in 30 minutes by means of four bolts and two hydraulic line couplers. A vertical agitator for loosening material in the body is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 637.



Any dump-body 96 inches wide will take the hydraulically operated Hydro-Spreader. It will spread 9 to 35 feet wide at speeds up to 30 mph.

The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently and economically.

Ten AISC Scholarships

The American Institute of Steel Construction will award ten $1,000 scholarships in 1952 to high-school seniors who want to make a career in civil engineering. The ten winners will be selected from nominations to be submitted by steel-fabricating companies all over the United States. Each winning candidate may use his $1,000 scholarship at any one of 125 accredited colleges in the country which offers a degree in civil engineering. A committee of prominent engineering educators will select the winners and will make its final selection in July.

The closing date for applications is April 15, 1952, and rules for application are as follows: To be eligible for competition, each student must be nominated by a structural-steel-fabricating company which is a member of the Institute. Candidates do not necessarily have to reside in the city in which the fabricator's plant is located. High-school seniors who wish to compete but who do not know the names of any fabricating companies in their areas may obtain a list by writing to American Institute of Steel Construction, 101 Park Ave., New York 17, N. Y. Scholarship application blanks may be obtained either from the Institute or from member companies. Candidates must be interested in a career in civil engineering. They must show evidence of scholastic ability along engineering lines, and they should be all-around students who have participated in extra-curricular activities during their high-school course.

This is the third year in which the Institute has sponsored a scholarship program to interest young people in a civil-engineering career and make it easier for the winners to acquire the necessary technical education.

American Lumber Promotes

Herbert W. Angell has been appointed Technical Director of American Lumber & Treating Co., Chicago, Ill. Mr. Angell, who assumes responsibility for management of the wood-preserving company's technical department, laboratory, and quality-control department, joined American Lumber in 1938 as an apprentice, and returned to the firm in 1940 on acquiring his master's degree in forestry. He is well known for his work in wood treating, glues, and laminating techniques.

Distributor Doings

Dealers Meet in Chicago; Lambaste OPS, Elect Hush

AED Opposes Existing Price Control on Used Equipment and Tackles Other "Mobilization" Problems at 33rd Convention

By MICHAEL A. SPRONCK,
Associate Editor

Here is the AED 1952 Board of Directors. Outgoing President R. L. Arnold is seated third from the left; at the head of the table is 1952 President H. J. Hush.

• DELEGATES from virtually every segment of the construction industry chalked up a record-breaking attendance of over 2,600 at the 33rd Annual Meeting of the Associated Equipment Distributors in Chicago, January 27 to 31. Dealers, salesmen, manufacturers, contractors, and Washington representatives converged on the Conrad Hilton (Stevens) Hotel and poured into the meeting rooms and banquet halls, seeking answers to current problems that face the industry. OPS regulation 105 got the biggest play in panel discussions and hallway conversations, but materials allocations, equipment financing, rental agreements, and some crystal-ball gazing also came to the fore during the night and day sessions.

Off to a Good Start

Just about everyone attended the Early Birds' Breakfast Monday morning, and with convention registration a few hundred higher than expected, some of the late-comers missed out on that "Genuine Mountain Moose Milk", a real bracer if there ever was one. Region XIV, host, provided a man-sized breakfast to go with it, though—a good thing, for the next four days were busy ones.

The Monday morning business session started the ball rolling with the President's message and the reports of various officers and committees. Ray Arnold, President, briefly reviewed the work of the past year and the growth of the AED. He urged members to get out and fight for sound political and economic platforms in this election year. Field Secretary J. R. Randle, and the Nominating, By-Laws, and Resolutions Committees also made their reports at this session.

Resolutions Hit Government

The resolutions taken by the delegates highlight some of the current equipment-dealer problems. AED urged manufacturers to balance production of new machines and spare parts so that equipment now in the field can be kept at maximum efficiency; further, that NPA realize the importance of this matter and increase the allotment of materials to manufacturers for this purpose. The second resolution cited AED's disapproval of the current price regulations on used machinery (CPR 105). The members really hashed this one out with OPS representatives at one of the sessions held later in the week. In separate resolutions the Association suggested that the Government practice what it preaches in the way of business economy, and specifically that it stop performing public construction by force account. The contract method is the most efficient and economical method, and therefore in the best interest of all taxpayers, said AED.

Customer Relations

Guest speakers covered three important topics in the first afternoon session: customer relations, financing, and sales management. The first speaker was the attractive Secretary-Treasurer of Bow Lake Equipment Co., Inc., Seattle, Wash., Mrs. Marjorie Creim, who gave her audience some good tips on customer relations. It is likely to take 17 or 18 calls, costing $500 to $1,000, to establish a contractor as a good customer, she said. Therefore it is important not to lose this customer carelessly. Mrs. Creim gave some good examples of ways in which a customer can be lost carelessly: for example, by a parts manager who lets earliest orders get buried on the bottom of his pile while he's busy answering the latest orders on top; or by dunning a customer *before* checking thoroughly on possible reasons for the delay in pay-

(Continued on next page)

Chances are that when the flash bulbs had flashed and AEDers could turn back to their tables, talk centered on OPS regulation 105, materials allocations, equipment financing, rentals, or the outlook for 1952—all prize topics at the 33rd Annual Meeting.

Distributor Doings

(Continued from preceding page)

ment. Mrs. Creim also warned against chasing after will-of-the-wisp "big" buyers at the sacrifice of old standby customers. Her suggestions to manufacturers were that they tell their dealers about the "bugs" in any new equipment *before* a sale is made, and that they follow up after a sale with the same type of customer relations that the distributor is likely to employ—gaining the long-term good will of the buyer.

Equipment Financing

E. F. Longinotti, Vice President of the Union Planters National Bank & Trust Co., Memphis, Tenn., gave AED members a banker's-eye view of construction-equipment financing. Pointing out that buying on-the-cuff is here to stay, Mr. Longinotti emphasized the importance of sound financing. Know your customer, get a one-fourth to one-third initial payment if you don't, limit the term of the paper to two construction seasons at most (18 to 24 months), and seek the advice of your local banker when you are in doubt about credit risk, he suggested. Inflationary periods tend to increase credit risks, and shortly after a recession of international conflict, borrowers and their banks are confronted with loan-repayment problems, according to Mr. Longinotti. The importance of credit investigation should not be underestimated, he warned. A bank or credit bureau can be of great help in this regard.

Down With CPR 105

After a one-day interlude for distributor-manufacturer conferences, the membership tackled the problems of material and equipment allocations and price control — especially the latter. Representatives of Government agencies were on hand to answer questions directed at them from the floor through portable microphones. The panel included A. A. Stone, Chief of Machinery Branch, Office of Price Stabilization; A. E. Loder, Chief of Construction, Mining, and Quarrying Section of the OPS; M. B. Garber, Director of Construction Machinery Division, National Production Authority; and C. J. Haring, Deputy Director of the Division.

Virtually all questions were addressed to the OPS representatives and the sole topic of discussion was CPR 105 which controls the ceiling price on used machinery. The panel was unable to justify this "unnecessary and ill-conceived regulation" to the satisfaction of the dealers present. But AED members did agree that the representatives were honest and fair in their efforts to implement the law and modify it to fit business practice in the construction-equipment industry.

Recognizing that attempts to have the regulation pushed down the "memory hole" would have no success, the equipment dealers proposed certain changes to tailor it to the construction industry. As now written it covers all types of used machinery on an equal basis — everything from sewing machines to food-processing equipment. Here are the objections to the present law and the suggested changes which have been passed along through the AED National Affairs Committee to the Office of Price Stabilization:

1. *Replace the present guarantee with a more realistic warranty.* CPR 105 requires dealers to guarantee successful service of rebuilt machines for 90 days and to provide parts and service for the equipment if it ceases to operate efficiently. This is more than is demanded of a manufacturer selling a new machine. Most manufacturers war-

(Continued on next page)

Distributor Doings

(Continued from preceding page)

rant a unit for 30 days and then provide only replacement parts shipped from the factory—not the labor. Under the existing regulation on used equipment, a dealer has to send a service man and parts to wherever the machine is when it breaks down.

2. *Correct the inequities in determining the base price of machines*—on which the ceiling price is established—principally on models no longer in production. The existing order requires that the machine be identified by serial number (often difficult or impossible) and that the manufacturer's original price be used. The simple and logical method would be to use the price of the equivalent machine currently in production.

3. *Reduce the amount of paper work.* At present, dealers have to include a detailed description of the machine, its year of make, name of manufacturer, etc., along with a lengthy notice of guarantee, on the invoice.

4. *Establish intelligent figures for percentage of base price allowed in determining the sale price.* The present inflexible 55 per cent for as-is used equipment and 85 per cent for rebuilt machines tend in some cases to be "floors" instead of "ceilings". In many instances the cost of rebuilding a machine is more than the 30 per cent allowed.

5. *Use realistic depreciation schedules.* In line with their complaint about inflexibility in the "value" of used equipment, the dealers complained about equal inflexibility in determining depreciation — where this method is used in computing the base price. A month-old machine is obviously worth more than 55 per cent of the manufacturer's list price, and it is equally obvious that it may be worth more than the 80 per cent allowed under the alternate (depreciation) method. Even if the dealer were to rebuild the machine, replacing all worn parts and giving it a guarantee that surpasses the original issued by the manufacturer (as is required under the order as it now stands), he would be allowed only 85 per cent of the original price.

6. *Account for freight costs.* The existing regulation considers only the list price of the new machine in determining the base price. This is contrary to standard practice, particularly in the wide-open spaces of the far west.

7. *Account for dismantling costs.* Since CPR 105 does not take these costs into account in any way, the dealer must bear them when a machine has to be knocked down for shipping.

8. *Permit financing charges when a unit is bought under a rental-purchase option.* Though in standard practice a nominal charge is made for the use of the distributor's capital during the rental period, the regulation limits the rentals collectable to the ceiling price, as if the machine had been sold outright on the date of the original agreement.

Outlook for 1952

J. R. Steelman, President of the Construction Industry Manufacturers Association, reported on the availability of equipment in 1952. The big squeeze, he pointed out, is on those units in demand by the military—heavy-duty tractors, off-the-highway hauling equipment, and medium and large-sized shovels and cranes.

Walter Couse, Vice President of the Associated General Contractors of America, spoke on the outlook for construction in 1952. He predicted about $27 to $28 billion of new construction and an additional $9 billion of repair and rebuilding. Though residential, commercial, and institutional building will decline, construction requiring greater amounts of equipment will continue at the 1951 pace, he said. The limiting factor on work completed will be materials rather than equipment, but repair parts can be an important influence. Mr. Couse emphasized repeatedly the need for an adequate supply of parts to keep old machines in operation. He also spoke of local dislocations of materials supplies—cement was the prime example—and the adverse effect they have on construction. He described the efforts AGC is making to obtain legislation offsetting the attitude of the U. S. Supreme Court in its handling of the Wunderlich case and the contribution AGC construction groups are making in the defense effort at home and abroad.

Mrs. Marjorie Creim gives AED convention delegates some tips on good customer relations. She is Secretary-Treasurer of Bow Lake Equipment Co., Inc., Seattle, Wash.

Brig. Gen. A. W. Pence, Assistant Chief of Engineers for Military Supply and Procurement, Corps of Engineers, U. S. Army, outlined the military program for 1952. Civil works will run slightly higher than in 1951, though the main portion will be on jobs already started. The total will reach $660 million. The military demands will be about $2.8 billion with three-fourths of the work being done right in the

(Continued on next page)

Distributor Doings

(Continued from preceding page)

States; the major portion will be spent on buildings and structures. General Pence pointed out that this is 9 per cent of the total U. S. construction—about the same as was accomplished in 1941 with less equipment available. The greatest need, he said, is for repair parts. Overseas work, though, requires new equipment. The orders for this will be on a par with last year's—$50 million worth. According to the General, very little of this machinery will return to the U. S. to glut the market. The repair and utility program will require only small amounts of light equipment and tools.

The equipment demand for troops in service will be large but not much in excess of the last year or two. The Army repair program is likely to be a headache. According to the General, the GI is an expert at smashing equipment and contributing to an early breakdown of parts. Field maintenance will be handled by troop commands but basic repairs will be made at the Corps' ten engineering depots. As in the past, some of this work will be farmed out to local distributors' shops under 520 contracts. This repair program will require about $2 million in spare parts for 1952, most of which will be purchased centrally from the Columbus, Ohio, depot. Right now, according to General Pence, all purchases seem to be on a par with last year's, but if the hot war cools off, look for a slackening in late '52.

New AED Officers

The 1952 officers of the AED are as follows: President, Harry J. Hush, Griffin Equipment Corp., New York, N. Y.; Executive Vice President, S. J. Oechsle, Metalweld, Inc., Philadelphia, Pa.; Vice Presidents, G. W. Gagel, Machinery & Supplies Co., Inc., Kansas City, Mo.; Frank Skidmore, Contractors' Machinery & Supply Co., Albuquerque, N. Mex.; J. G. G. Morgan, Vancouver Equipment Corp., Vancouver, B. C.; Treasurer E. J. Crosby, Hedge & Mattheis, Boston, Mass.

New and re-elected directors are as follows: Region I, A. Ashley Carroll, Eastern Equipment Sales, Inc., Springfield, Mass.; Region III, S. John Oechsle; Region V, M. C. Bishop, Tri-State, Inc., Atlanta, Ga.; Region VII, L. M. Doolen, Telford Equipment, Lansing, Mich.; Region IX, G. W. Gagel, (re-elected); Region XI, Beal Shaw (re-elected), Shaw Sales & Service Co., Los Angeles, Calif.; Region XIII, W. R. Parnell (re-elected), Construction Machinery Corp., Shreveport, La.; and Region XV, J. G. G. Morgan.

"Operation Field Experience"

Rish Equipment Co., Bluefield, W. Va., came out with a new wrinkle in sales training last January. For four days beginning January 14, Richmond, Va., was the scene of "Operation Field Experience". The Rish Co.'s entire sales staff of 80 men, from the company's six offices in a 3-state area, donned overalls; top officials and managers did the same; and the whole party went into action to operate the heavy machinery which Rish sells—among other units, Barber-Greene

(Continued on next page)

An abandoned gravel pit near Richmond, Va., was the scene of Rish Equipment Co.'s "Operation Field Experience". Rish's 80-man sales and executive staff operated $250,000 worth of equipment for four days. Here are the machines in action.

Lew Colby (left), Barber-Greene service man, shows Bill Gardner, Rish salesman, how to operate a loader.

ditchers and loaders, Hough Payloaders, International tractors, Euclid trucks, Adams motor graders, Bucyrus-Erie scrapers, Ingersoll-Rand compressors and wagon drills, and Disston chain saws.

The men were quartered in the Jefferson Hotel and drove out every morning to a vacant piece of land on the outskirts of Richmond, where they spent the whole day operating the equipment. Lunch was served in a large tent on the site. Not only the Rish men themselves but the manufacturers of the equipment expressed deep interest in the experiment, which gave the salesmen a real insight into actual operating conditions.

On Friday night, January 14, Rish held its annual sales banquet at the Jefferson Hotel, and on this occasion President Rish presented awards to 1951's top salesmen.

Four Men and a Saw Go on Circuit

From Portland, Maine, to Portland, Oreg., with stopovers that included 14 major cities—that was the itinerary recently undertaken by a four-man team and a lightweight chain saw. The idea, of course, was to introduce to dealers the new DA-211 chain saw made by Henry Disston & Sons, Inc., Philadelphia, Pa.

The cross-country caravan traveled exclusively by air (except from Chicago to Duluth when bad weather grounded all flights), and the one-day sales meetings in major marketing areas attracted dealers and distributors from hundreds of miles around. Members of the team got to know the men who sell to the consumer. They answered questions, listened to gripes, and conducted "information please" panels with dealer friends. Their program included slide films, dramatic skits, and colorful props.

The three steady members of the 4-man team were W. P. Gillespie, then Sales Manager of the Power Tool Division (he now manages the Hardware Division); Eugene Biemuller and Joseph A. Richter, Jr., also of the Power Tool Division. The fourth man's duties were undertaken at various times by J. H. Dingee, then Disston Advertising Manager (he has now succeeded to Mr. Gillespie's former post), or by Bradford K. Cross or John T. Lyons of Disston's advertising agency.

The team held its meetings in the following cities: Portland, Maine; Utica, N. Y.; Cleveland, Ohio; Philadelphia, Pa.; Greensboro, N. C.; Atlanta, Ga.; Memphis, Tenn.; Lufkin, Texas; Jefferson City, Mo.; Chicago, Ill.; Duluth, Minn.; Salt Lake City, Utah; San Francisco, Calif.; and Portland, Oreg.

(Continued on next page)

Portland, Oreg., was the last stop on the coast-to-coast trip Disston officials took to introduce their new lightweight saw to dealers. Senator James H. Duff presents the saw to the City of Portland and Mayor Dorothy McCullough Lee accepts it.

Distributor Doings

(Continued from preceding page)

Nevada Firm Changes Hands

A-D Machinery Co., 251 W. Commercial St., Elko, Nev., came into being the first of this year when Harold Anderson and Ralph Druehl purchased the Machinery Department of C. W. Paul Hardware & Machinery.

The firm is distributor in the northeastern part of the state for the industrial and agricultural equipment of The Allis-Chalmers Mfg. Co., Milwaukee, Wis. Other equipment handled by A-D includes Gar Wood scrapers and dozers; Tractomotive loaders and rippers; Buckeye shovels and ditchers; Worthington pumps; and Fairbanks-Morse light plants and pumps.

Waco Distributor Conference

The third annual sales conference of distributors of Waco scaffolding equipment took place at the Leamington Hotel in Minneapolis on January 14 and 15.

K. H. Wilson, Vice President of Wilson-Albrecht Co., Inc., Minn., addressed the 40 distributors and invited their participation in the development of Waco's national sales program for 1952. Mr. Wilson's keynote address, entitled "This Is Your Business", stressed the importance of individual initiative in rendering greater service to the construction industry and establishing steel-scaffolding equipment as basic construction inventory. So far, said Mr. Wilson, the steel-scaffolding industry has explored only one-fifth of the marketing potential among contractors. The first big step in correcting this state of affairs is to show contractors where sectional steel scaffolding represents a real profit in more on-the-job man-hours and less depreciation.

To illustrate his point, Mr. Wilson gave the group a number of special demonstrations, including a detailed study of "speed methods" in erection of Waco sectional scaffolding, and another showing the features of Waco scaffolds and masons' T-jacks.

Among other speakers at the 2-day conference were representatives of the F. W. Dodge Co., who outlined the company's job-reporting program. Representatives of various service organizations addressed the group on insurance, advertising, and business management.

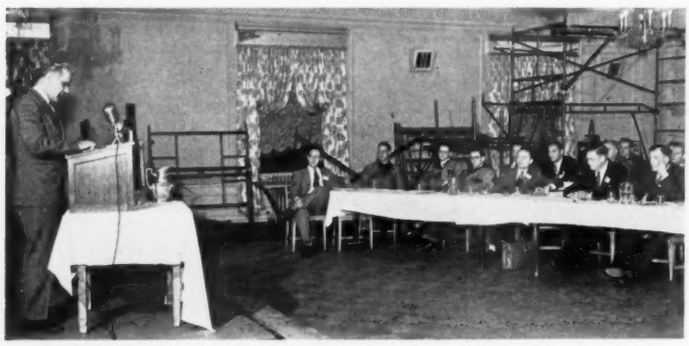
Cummins Reorganizes Dealership

Raymond H. Snyder, former President and Treasurer of Snyder Aircraft Division, Air Associates, Chicago, Ill., recently purchased certain assets of the Chicago operation of Cummins Diesel Sales Corp. He will operate the Chicago facilities as an independently owned Cummins dealership with the new name of Cummins Illinois Engine Sales, Inc. Headquarters of the new company will remain at 1700 S. Indiana Ave., Chicago, and the territory it will handle includes the 22 counties of northern Illinois; Scott County, Iowa; and Lake, Porter, and La Porte Counties in northern Indiana.

Operations at Milwaukee, Wis., and Peoria, Ill. (both formerly headquartered at Chicago), will now be conducted as individual dealerships of Cummins Diesel Sales Corp. The Milwaukee territory (Dealership Manager, R. R. MacDonald) will include the upper peninsula of Michigan, with the exception of the county of Gogebic and the state of Wisconsin, with the exception of the counties of Iron, Ashland, Bayfield, Douglas, Washburn, Burnett, Polk, St. Croix, Pierce, Pepin, Buffalo, Dunn, and Trempealeau. The

(Continued on next page)

Western Massachusetts construction was the gainer when Hedge & Mattheis Co. of Boston opened a new sales and service warehouse at 413 Main St., West Springfield. Here is the new branch office, of which "Spud" Daniels is District Manager and Hughie Hughes, Associate Manager.



Curlys Slocum, Waco distributor in Boston, Mass., addresses the annual sales conference of Waco distributors at Minneapolis, Minn. New speed methods of erecting and dismantling were given special study.

Distributor Doings

(Continued from preceding page)

Peoria territory (Dealership Manager, E. E. Sandtner) includes that part of the state of Illinois bounded on the north by, and including, the counties of Mercer, Knox, Stark, Putnam, Marshall, Livingston, Ford, and Iroquois; and bounded on the south by, but not including, the counties of Calhoun, Greene, Macoupin, Montgomery, Fayette, Effingham, Jasper, and Crawford.

Cummins Diesel Sales Corp., Omaha, Nebr. (Dealership Manager, W. D. Blizzard), takes over the central and eastern portions of Iowa, with the exception of Scott County.

Anderson-O'Brien Handles Seaman

A recently appointed distributor for Seaman Motors, Inc., Milwaukee, Wis., is Anderson-O'Brien Co., 746 E. Washington Blvd., Los Angeles 21, Calif. Anderson-O'Brien takes over the southern half of California for the distribution of Seaman's line of rotary tillers, Pulvi-Mixers, and Trav-L-Plants, and the firm carries a complete stock of parts as well as maintaining a 24-hour-a-day service staff.

In order to help handle the Seaman line, Anderson-O'Brien has established two new California dealers: Lawless Bros., 1131 33rd St., Bakersfield; and Lancaster Engine Co., Lancaster.

Wing Is Huber Distributor

R. B. Wing & Son Corp., 384 Broadway, Albany, N. Y., has recently been named distributor in the Albany area for Huber Mfg. Co., Marion, Ohio. The President of the distributor firm is Charles C. Wing, and the Vice President is H. P. Shollenberger. Sales representatives include Albert Houck, Bill Houck, Ray B. Butts, Howard Nicks, and Claude Reynolds. Wing & Son handles Huber graders, tandem and 3-wheel rollers, and the 42½-hp Huber Maintainer.

To Work With Gar Wood Dealers

A recent announcement concerns two district managers appointed to the Findlay Division of Gar Wood Industries, Inc., to work with distributors of Gar Wood scrapers, shovels, cranes, and blade equipment, and Buckeye trenchers, spreaders, and road wideners.

William H. McAllister, who formerly covered the Memphis territory, will be working with the following Texas firms: Benson Tractor Co. and Boebck Engineering Co., Houston; Fred Berryhill Equipment Co., Lubbock; Conlan Tractor Co., Lubbock and Abilene; Tom Carpenter Equipment Co., Amarillo; Equipment Supply Co., El Paso; Road Equipment Co. and Shaw Equipment Co., Dallas; Miller Ward Machinery Co., Tyler. He will work with Boardman Co. in Oklahoma City, and with the New Mexico firms of Harry Cornelius Co., Albuquerque, and Smith Machinery Co., Roswell.

In the Memphis territory, Guilford E. Koehler is District Manager working with the following Tennessee firms: Dalrymple Equipment Co., Amory and Memphis; Hawkins Equipment Co., Memphis; McCarthy, Jones & Woodward, Nashville; Wilson-Weesner-Wilkinson, Nashville and Knoxville; and Osborne Equipment Co., Knoxville and Chattanooga. The Mississippi firms under his jurisdiction are Southern Equipment Sales and Watkins Aldridge

(Concluded on next page)

A warm welcome? That's what we think. When AED members attended their convention in Chicago last January, International Harvester Co. issued a cordial invitation to them to visit an industrial-equipment display in the company's showroom at Michigan Avenue and Lake Street.

Distributor Doings

(Continued from preceding page)

Equipment Co., Jackson; the Missouri firms are Cooke Tractor Co. and Hennessey-Forrestal Machinery Co., St. Louis; the Illinois firms are Ed. Meyer Tractor Co., Illinois Road Equipment Co., and Dunmire Equipment Co. of Mt. Vernon, Springfield, and El Paso respectively. Mr. Koehler will also cooperate with Kern Limerick, Inc., Little Rock, Ark., and Southern Equipment & Tractor Co., Baton Rouge and Monroe, La.

Three More Handle Cleco

The Cleco Division of the Reed Roller Bit Co., Houston, Texas, announces the appointment of the following distributors to handle the company's Cleco and Dallett lines of air tools and accessories: George W. Cassady Co., Sylvan Dell Road, Williamsport, Pa.; Davenport Engineering Co., 415 W. Third St., Davenport, Iowa; and Monogram Air & Power Equipment, Inc., 125 Olive St., New Haven, Conn.

Dizzy December for Northwestern

Northwestern Equipment, Inc., of Fargo, N. Dak., distributor of Heil and other construction equipment, closed the year with a bang, judging by the accounts reaching us of this firm's busy December. December 10-12 was devoted to a three-day sales clinic, during which Northwestern personnel thoroughly explained and discussed all the principal products the firm sells. Then on December 15 came the birth of a new company magazine, "Northwestern News", which will go out monthly to a mailing list of nearly 2,500. The company feels that this paper will be very effective in building reputation and good will within a widening circle of contractor customers. A feature of the magazine is to be "Contractor of the Month", dealing in each issue with a different contracting firm.

Finally, December 20 saw Northwestern's annual Christmas party for employees and their families. Turkey, trimmings, and bonuses were the order of the day.

Visits South America Dealers

Max Hofmann, Export Sales Manager of Waukesha Motor Co., Waukesha, Wis., is on an extended trip to South America to visit distributors there who sell Waukesha engines and power units. Mr. Hofmann, who expects to return some time this month, is including in his itinerary Mexico, Panama, Colombia, Ecuador, Peru, Chile, Argentina, Brazil, Venezuela, and Puerto Rico.

Lima-Hamilton Appoints Cleveland

Cleveland Contractors' Equipment Co., 12500 Berea Road, Cleveland, Ohio, is newly appointed sales agent in northeastern Ohio for Baldwin-Lima-Hamilton Corp., Lima-Hamilton Division, Lima, Ohio, manufacturer of power shovels, cranes, and draglines.

Minnesota Dealer Handles Jeffrey

Continental Sales & Equipment Co., Hibbing, Minn., is a recently authorized distributor in Minnesota for Jeffrey Mfg. Co., Columbus, Ohio, manufacturer of belt conveyors, crushers, feeders, chains, and transmission machinery.

Optimism on Highway Future

Roy E. Jorgensen, Engineering Counsel for the National Highway Users Conference, recently expressed the opinion that solutions would be found to the various problems which beset the highway administrator of today. Speaking at the annual meeting of the California Street and Highway Conference, Mr. Jorgensen mentioned some of these problems.

Inflation is one of the worst, said Mr. Jorgensen. It "whipped the road program that seemed to be getting geared up after World War II". Another setback has been limitation on the use of steel, resulting from the war in Korea. Failure of some defense officials, he thinks, to recognize the essential relationship of the highway program to mobility, has done nothing to improve this situation.

A third and very serious problem, according to Mr. Jorgensen, is caused by the fact that engineering departments are being "riddled" by retirements and resignations, unfilled by new recruits. Most highway organizations, however, are instituting recruitment programs with a view to overcoming this obstacle, and in addition summer employment is being offered student engineers to show them the advantages and importance of the work. The United States Bureau of Public Roads, as well as nine state highway departments, have organized training programs, but Mr. Jorgensen pointed out that in order to draw top engineering talent, state departments will have to offer good salaries. Technical developments, too, such as photogrammetry for surveying, will largely help to fill engineering gaps, said Mr. Jorgensen.

As to finance, Mr. Jorgensen stressed that the New Jersey and Pennsylvania Turnpikes were made possible not by toll financing but in the first place by bond-financing.

Ending on a note of optimism, Mr. Jorgensen saw encouragement in the development, among industries and other interested groups, of advertising directed toward a public understanding of road needs. "We can see now", he said, "the beginning of a new national movement for good roads."

Resurfacer for Floors

A bulletin describing Swift-Floor floor-resurfacing material is announced by The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 16, Ohio. Illustrations show how the plastic material is applied in three operations to resurface rough floors. It comes ready to use, can take heavy-duty traffic 60 seconds after application, and is said to stand 50,000-pound loads.

This literature may be obtained from the company by requesting Bulletin 142-11, or by returning the Request Card that is bound in at page 16. Circle No. 604.

Convention Calendar

March 19-21—N. Y. Highway Engineers
Annual Convention, New York State Association of Highway Engineers, Hotel New Yorker, New York, N. Y. Convention Secretary, Harry Spitzer, Box 38, State Office Bldg., Babylon, Long Island, N. Y.

April 1-3—Highway Engineering Conference
Annual Highway Engineering Conference, Ohio State University, Columbus, Ohio. Emmett H. Karrer, Prof. Highway Engineering, Brown Hall, Ohio State University, Columbus 10, Ohio.

April 1-4—New York Safety Meeting
Annual Convention, Greater New York Safety Council, Hotels Statler and New Yorker, New York, N. Y. Paul F. Stricker, Executive Vice President, 60 E. 42nd St., New York 17, N. Y.

April 2-5—Roadside Development Course
Annual Short Course on Roadside Development, Ohio State University and Ohio Department of Highways, Columbus, Ohio. W. J. Garmhausen, Chief Landscape Architect, Ohio Department of Highways, Columbus 15, Ohio.

April 7-9—Lubrication Meeting
Annual Meeting and Lubrication Show, American Society of Lubrication Engineers, Hotel Statler, Cleveland, Ohio. W. F. Leonard, Secretary, 343 S. Dearborn St., Chicago 4, Ill.

April 9-10—Earth-Moving Conference
Third Annual Earth-Moving Industry Conference, Central Illinois Section of the Society of Automotive Engineers, Pere Marquette Hotel, Peoria, Ill. E. R. Maxfield, Publicity Chairman, Society of Automotive Engineers, Central Illinois Section, 607 Garland, Peoria, Ill.

April 14-15—Highway Short Course
Annual Highway Short Course, South Dakota State College, Brookings, S. Dak. Emory E. Johnson, Prof. Civil Engineering, South Dakota State College, Brookings, S. Dak.

April 14-17—Purdue Road School. Road Show
Annual Road School, Purdue University, Lafayette, Ind. Prof. Ben H. Petty, School of Civil Engineering, Purdue University, Lafayette, Ind. Also, Road Show, Indiana Highway Materials and Equipment Association, Purdue Armory, Lafayette, Ind. Tom Goby, Secretary, Highway Materials and Equipment Association, 310 High St., Bloomington, Ind.

April 17-18—Highway Conference
Annual Meeting, Kentucky Highway Conference, College of Engineering, University of Kentucky, Lexington, Ky. R. E. Shaver, Head, Department of Civil Engineering, University of Kentucky, Lexington, Ky.

April 17-18—Airfield Pavement Symposium
Symposium on Airfield Pavements for Jet Aircraft, U. S. Naval Civil Engineering Research and Evaluation Laboratory, Bureau of Yards and Docks, Port Hueneme, Calif. J. A. Bishop, Director, Soils and Pavements Division, Structures Research Department, U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif.

June 23-27—ASTM Meeting
Annual Meeting, American Society for Testing Materials, Hotels Statler and New Yorker, New York, N. Y. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

Rubber-Road Test Sections

During the American Road Builders' Association conference at Houston, Texas, on January 21-24, Brown & Root, Inc., laid some test sections of rubberized asphalt paving on Reisner Street from West Capitol to Washington Avenue. The Firestone Tire & Rubber Co. provided the natural, synthetic, and processed ground rubber which was mixed with Houston's type F nonskid asphalt surface course and applied as a 1-inch wearing surface.

In Washington, D. C., last October, Firestone also cooperated with the Federal Bureau of Public Roads in a test installation of a rubberized bituminous road on Michigan Avenue between North Capital and First Streets, N. W. The three types of rubber were each mixed with sand and asphalt, and control sections were installed for purposes of comparison.

Firestone is busy developing its own experimental program on the use of rubber in paving materials. At the same time, its technicians are cooperating with universities throughout the country in their research to determine the durability of rubberized asphalt paving and its resistance to hot and cold weather.

Australia to Hold Construction Fair

The first Australian Construction Industries Fair and Convention is to be held in Sydney in April. The fair, which will be the largest exhibit of earth-moving and construction equipment ever held in Australia, will be along the lines of the American Road Builders' Association periodical road show, with the difference that in Australia the whole of the construction industry has been included. The exhibits are to be restricted to machines of Australian manufacture, but the majority of these are produced in Australia under license from American companies.

Such companies include Allis-Chalmers Mfg. Co.; R. G. LeTourneau, Inc.; Link-Belt Co.; Bucyrus-Erie Co.; The Heil Co.; Littleford Bros., Inc.; Blaw-Knox Co.; Chain Belt Mfg. Co.; Eimco Corp.; Barber-Greene Co.; Whiteman Mfg. Co.; Frank G. Hough Co.; and Oliver Corp.

Large diesel engines are not made in Australia, so they will be featured in the fair only in the form of power units for heavy equipment. Crawler tractors will be on show provided they have the maximum of Australian-made equipment attached to them. Featured tractors will be Allis-Chalmers, International, and Oliver.

Government departments which are also construction authorities will exhibit models of large national works as an indication of the projects which are now under construction in Australia.

The New South Wales state government is backing the fair and convention, which is under the direction of the Honorable J. J. Cahill, Deputy Premier and Minister for Public Works and Local Government, New South Wales.

The National pneumatic pipe saw cuts cast iron or steel pipe from 12 to 48 inches in diameter.

Pneumatic Pipe Saw

A portable pneumatic saw for cutting cast-iron and steel pipe is manufactured by The E. H. Wachs Co., 1525 N. Dayton St., Chicago 22, Ill. Powered by a Thor air motor supplying 85 psi, National pipe saw uses a high-speed steel milling cutter. It travels around the pipe under two chains which hold it tight to the pipe and provide a flexible ring gear for positive feed.

Cuts above ground are made with the pipe on skids. In a ditch, 16 inches of clearance are required. The saw will cut 12 to 48-inch pipe at a speed of 2 inches per minute. The company claims that two men can handle and set up the 285-pound unit in a few minutes. All adjustments are said to be well marked and easy to make. Grease seals protect against water, sewage, sand, scale, and cuttings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 629.

HRB Bulletin Reviews Volcanic, Laterite Soils

The Highway Research Board's Bulletin No. 44 contains two papers dealing with highway-construction problems where volcanic-ash and laterite soils are concerned.

The first paper, "Highway Construction Problems Involving Plastic Volcanic Ash", is by K. B. Hirashima, Testing Engineer for the Territorial Highway Department, Hawaii. It discusses the peculiarities of certain highly plastic soils, derived by the weathering of volcanic ash under conditions of continuous moisture, along the eastern shores of the Island of Hawaii. Such soils, having a natural moisture content of about 200 per cent, need special methods of construction which the author explains. One particularly beneficial step has been the provision of a layer of rocky material to give positive traction for construction equipment during grading operations.

"Laterite Soils and Their Stabilization", by Hans F. Winterkorn and E. C. Chandrasekharan, of the Winterkorn Road Research Institute, Princeton, N. J., covers the origin, occurrence, and correct identification of laterite rock and soil. The authors suggest methods of dealing with these soils and stabilizing them; in experiments it was found that portland cement gave best results in some cases and aniline-furfural in others.

HRB Bulletin No. 44 includes maps, photographs, tables, and bibliographical reference lists. It may be obtained by writing to The Highway, Research Board, 2101 Constitution Ave., Washington 25, D. C. The price is 60 cents a copy.

Catalog on Conveyor Belts

A new catalog on conveyor and elevator belting gives the necessary data to lay out a drive or specify a belt. It is issued by New York Belting & Packing Co., 1230 Avenue of the Americas, New York 20, N. Y. Complete tables of carrying capacities, horsepower factors, pulley diameters, and maximum and minimum plies for proper troughing are included, as well as other engineering information.

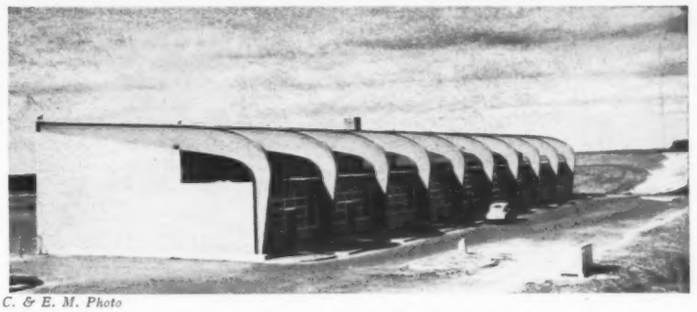
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 601.

Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

Rhode Island Builds New Modern Airport

Commercial Field Has Mile-Long Bituminous-Concrete Runway; Novel Hangar Designed With Cantilever Welded-Steel Frames



C. & E. M. Photo

Rear view of hangar at North Central Airport, Smithfield, R. I., showing the structural ribs. The back portion consists of shop and office facilities running the whole length of the building.

• TINY Rhode Island recently completed construction of North Central State Airport at Smithfield, to serve the needs of the heavily populated residential and industrial areas of Pawtucket, Central Falls, and Woonsocket. Second only in size to the airport at Hillsgrove, which has a 6,000-foot runway, it will also serve as an alternate to the latter field for the Providence area. The new facility at Smithfield is equidistant, about 7 miles, from Providence, Woonsocket, and Pawtucket. It has a single northeast-southwest runway 5,000 feet long x 150 feet wide, paved with bituminous concrete.

Construction at the 170-acre site, roughly in the center of a state-owned 862-acre tract, got under way in February, 1950, and was completed in November, 1951. Total construction cost of the project was approximately $1,445,000. Knappen-Tippetts-Abbett-McCarthy, Engineers, New York City, handled all design and supervised the construction. M. A. Gammino Construction Co. of Providence, R. I., was general contractor.

In addition to the runway, the contract included an airplane parking apron—200 x 750 feet—also paved with bituminous concrete; a 2-story administration building, 30 x 80 feet; a hangar building, 225 x 67 feet; a utility building, 12 x 18 feet; and the installation of a fresh-water system, drainage system, sewage-disposal system, and complete airport lighting, distribution, and power system.

Grading

After clearing the thickly wooded site, the contractor started at once on the grading, which involved moving over 1,000,000 cubic yards of dirt. In general, the material was moved from a high spot near the center of the site to fill in low areas near the ends of the landing strip. At one time five shovels were busy on the excavation. Most of the dirt was moved with a fleet of 18 Euclids—15 with a 10-yard and 3 with a 14-yard capacity—and six 6-yard trucks. Half a dozen tractor-dozers and two motor graders leveled off the lifts and shaped the subgrade.

Flanking the 150-foot-wide runway pavement are 25-foot bituminous stabilized shoulders and 150-foot turfed shoulders, giving the strip a width of 500 feet. Under the pavement is a gravel subbase from 20 to 26 inches deep. This is topped by a dry-bound crushed-stone base course 6 to 8 inches thick that was choked with smaller stone and compacted by rolling. The stone base was given a bituminous tack coat before the bituminous-concrete wearing course was laid. For the last 500 feet at the ends of the runway the plant-mix is 4½ inches thick; over the rest of the runway the pavement is 2½ inches thick.

A vehicular parking area and a 4-mile road system within the boundaries of the field were constructed with a run-of-bank gravel base course, topped by a bituminous-treated gravel surface course. An access road, built by the State under a separate contract, connects the airport with George Washington Highway just west of the intersection of Louisquisset Pike.

Buildings

The general contractor sublet the construction of the hangar and administration building to the Agostino Construction Co. of Pawtucket. The 2-story administration building has footings, floor, and roof slabs of reinforced concrete, a structural-steel framework, and insulated aluminum fluted siding. An observation deck is on the second floor.

Of unique construction, the hangar is partly open-faced and partly closed. The open-face section is designed to accommodate the nose and engine portions of planes up to the size of a four-engine DC-4. The open and enclosed hangars across the front of the structure are respectively 150 and 75 feet long with a depth of 42 feet. The 60-foot overhead-type door for the enclosed portion provides a 20-foot vertical entrance clearance. The entrance clearance for the open section is about 28 feet. The rear portion of the hangar, for the full length of the structure, consists of shop, offices, boiler room, and toilet facilities, and has a width of about 25 feet and a ceiling height of 12 feet.

The hangar is constructed with ten cantilever, all-welded, rigid steel

(Concluded on next page)

Rhode Island Builds New Modern Airport

(Continued from preceding page)

frames, spaced at 25 feet, with footings and counterweights of reinforced concrete. Footings are 5 x 5 x 5-foot cubes; 1¼-inch bolts anchor the steel ribs to the concrete. The structure can be lengthened, if necessary, by erecting additional cantilever frames. The siding is of insulated fluted aluminum, while the roof is precast-concrete slabs. Coils for a radiant-heating system are embedded in the floor.

Incidentals

The fresh-water system consists of a deep well with an electrically driven pump discharging into an underground 60,000-gallon storage tank and cast-iron water mains. An electrically driven domestic water pump with an automatic-pressure storage tank provides normal water service to the administration and hangar buildings and fire hydrants. A gasoline-driven fire pump with automatic controls and an individual gasoline storage system is included for emergency service.

The drainage system consists of reinforced-concrete, cast-iron, corrugated-metal, and vitrified-clay-pipe culverts, interconnected with brick and concrete catch basins and manholes, and discharging through concrete headwalls. The sewage-disposal system consists of a reinforced-concrete septic tank, discharging into an open-jointed vitrified-clay-pipe drainage field.

Personnel

Operations of the M. A. Gammino Construction Co. were supervised by Jack Ramos, Superintendent.

The work was designed and supervised by Knappen-Tippetts-Abbett-McCarthy, Engineers, with Gerald T. McCarthy, Supervising Partner; Walther Prokosch, Designer; Andrew S. Balbiani, Project Engineer; and Joseph J. Rosa, Resident Engineer.

Correction

We wish to correct an error in our article on the J. A. Terteling & Sons contract for part of the Main Canal of the Columbia River Basin project. The concrete-curing material used on this project was Sealtex white pigmented curing compound made by Techkote Co., Inc., Inglewood, Calif.

Wire-Rope Assemblies

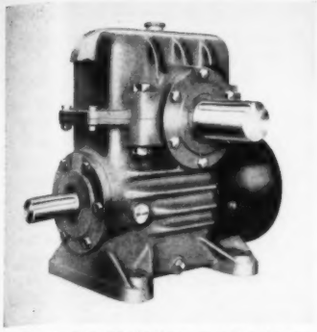
A 12-page catalog on wire-rope assemblies has been prepared by Macwhyte Co., Kenosha, Wis. It illustrates and gives specifications for wire rope with permanently attached fittings. The Safe-Lock terminals are available with eyes, studs, sleeves, hooks, etc., and are permanently swaged to the wire rope.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 639.

Folder on Conduit Clamps

A folder on clamps and straps for heavy wall conduit is issued by Victor Specialties, 775 Main St., New Rochelle, N. Y. It gives details and specifications on one and two-hole zinc-plated units.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 695.



The Crofts Radiation speed reducer comes in various ratios.

New Speed Reducer

A line of worm reduction gears is announced by National Transmission Distributors, Inc., 684 Broadway, New York, N. Y. Crofts Radiation speed reducers offer a variety of ratios, ranging from 5 to 1 through 100 to 1 and from fractional up to 400 hp.

The 1⅛, 1¾, and 2¼-inch-diameter units feature universal mounting for worm on bottom, top, or vertical installation. While delivery is made with assembly as specified, legs are removable and can be mated to other holes in the housing to permit varied mounting. Ten sizes ranging from 3½ through 14 inches are all fan-cooled.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 569.

Minneapolis-Moline News

Three new appointments were made at the annual board meeting of Minneapolis-Moline Co., Minneapolis, Minn., manufacturer of tractors, engines, mowers, and other equipment. Executive Vice President, Treasurer, and Director is Stacy L. Angle, formerly Vice President and Treasurer. General Sales Manager, Frank N. Langham, and Assistant General Sales Manager, Harry R. Colvin, are now also Vice President and Assistant Secretary, respectively. Mr. Angle and Mr. Langham have been associated with Minneapolis - Moline since 1920, and Mr. Colvin joined the company in 1927.

New Line of Trucks Has 5 Engine Models

A 1952 line of trucks ranging from light pickups to extra-heavy-duty units has been announced by Ford Division, Ford Motor Co., P. O. Box 638, Dearborn, Mich. The series from F-1 to F-8 starts with the small 114-inch-wheelbase and 4,700-pound-GVW type and increases to the 195-inch 41,000-pound-GCW model.

The company also offers five engine types, including three new high-compression low-friction overhead-valve units. The two original L-head engines have been improved to provide more horsepower and torque. The new overhead-valve types have compression ratios of 7 to 1, and horsepowers of 101, 145, and 155.

A shorter piston stroke is used on the new models to reduce friction along the cylinder walls. The crankshafts and camshafts of precision-molded cast alloy are lighter than forged parts and are said to provide superior wearing surfaces.

The company claims that the full-flow oil filter cuts cylinder-bore wear by as much as 40 per cent and ring wear by 62 per cent. Cylinder block and crankcase are cast in one piece and extend below the center of the crankshaft.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 616.

The Series F-8 truck cab and chassis is one of Ford's 1952 models. Designed for heavy-duty hauling, it may be powered by the 106-hp V-8 or the 112-hp Big Six engine.

Another 3.6 Miles Paved on U. S. 40

Section Now Completed in Illinois Replaces 16-Foot Road; Reinforced Concrete Is Laid on 6-Inch Granular Subbase

• THE long-range program for the improvement of U. S. 40 in downstate Illinois advanced further last year with the completion of another section, 3.6 miles long, between Casey and Vevay Park in Cumberland and Clark Counties. The new highway has a reinforced-concrete pavement 24 feet wide x 10 inches thick, and replaces a pavement only 16 feet or 18 feet wide x 8 inches thick. The new pavement, furthermore, is laid on a 6-inch granular subbase that extends one foot beyond the pavement on each side.

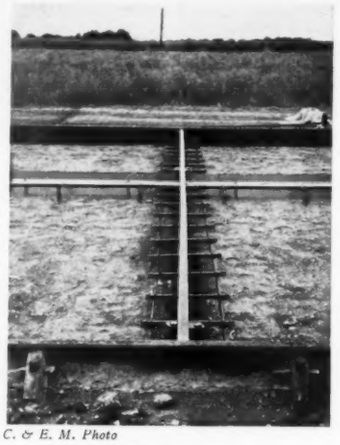
Work on the project got under way last April after the Illinois Department of Public Works and Buildings, Division of Highways, awarded a contract for the new road to the McCalman Construction Co. of Danville, Ill., on its low bid of $404,683. The job was completed by fall. On this same project, under a separate contract, the Standard Paving Co. of Chicago built a bridge over Range Creek.

Modern Design

Built about 1920, the original 16 and 18-foot x 8-inch concrete pavement had been patched and repatched, and its cracked and broken surface was badly in need of replacement. Heavy cross-state truck traffic over U. S. 40, which is a direct route between Terre Haute, Ind., on the east and St. Louis, Mo., on the west, demanded a thicker and wider pavement. So the Division of Highways acquired additional right-of-way between the existing highway and the main-line tracks of the Pennsylvania Railroad, which run south of and parallel to the highway at this point. The new highway was constructed on this recently acquired strip of land, with its center line about 150 feet north of the railroad, and from 100 to 150 feet south of the old road.

The old pavement will be torn up and removed, but the right-of-way will be retained. It is expected that another pavement will eventually be put down in its place, thus converting this stretch of U. S. 40 into a four-lane divided highway.

For the present, the new pavement carries traffic in both directions. The roadbed consists of a shallow fill for the entire 3.6 miles of improvement. The 24-foot pavement has a 1½-inch crown at the center, and is flanked by 10-foot shoulders that have a total pitch of 7½ inches. Sideslopes vary, but are generally 4 to 1. In cuts the slopes go down to a ditch that is 3 feet deep x 2 feet wide; backslopes are 3 to 1.



C. & E. M. Photo

A Laclede contraction joint on U. S. 40. Transverse and center joints are 18-gage metal plates 9½ inches deep.

Grading and Granular Subbase

Grading involved 169,517 cubic yards of excavation and 4,400 yards of borrow to build up the embankment fill. For the long hauls the contractor used five Tournapulls, averaging 12 yards a load with their Carryalls, for moving dirt as much as 1½ miles. On the shorter hauls he employed two tractor-scraper units—a 16-yard Caterpillar and a 12-yard La Plant-Choate scraper, both pulled by D8 tractors. Three tamping rollers and disks, pulled by D7 tractors, compacted the fills.

Granular borrow totaling 13,700 cubic yards for the subbase was obtained from the local gravel pits of Barthelemy & Lawrence north of Greenup, Ill., a 12½-mile haul to the job. It was spread and compacted 26 feet wide x 6 inches deep, the final shaping being done by Caterpillar motor graders.

Blaw-Knox steel road forms were then set and the pins driven by hand in parallel rows 24 feet apart, since the paving was done full width. Since the paver worked outside the forms on the north shoulder of the roadbed, the Laclede contraction joints were laid out ahead, 100 feet apart on centers. Before they were installed, the fine-grade was established with a Cleveland Trail-grader, riding on the forms and pulled along by a Caterpillar RD6 tractor.

This was followed by a scratch board to detect any high spots, and whatever final compacting was necessary was done with a hand roller.

Contraction Joints

Enough forms were on hand to lay out 2,000 linear feet of fine-grade and joints. Laclede Steel Co. of St. Louis supplied dowels, wire-mesh reinforcing, and the metal center strip, as well as the contraction joints. No expansion joints were employed. Both the transverse contraction joints and the center longitudinal joints consist of 18-gage metal plates 9½ inches deep—that is, with their tops ½ inch below the surface of the slabs. At 2½-foot intervals through the middle of the center strip are ⅝-inch deformed bars, 2½ feet long, with their ends firmly pinned into the subbase.

The transverse contraction joints are pierced by 1-inch smooth dowels, 18 inches long, on 12-inch centers. The 18-gage plate, topped with a heavy cap, was braced on the side away from the paver by thick back-up plates cut in two sections, 13 and 11 feet in length.

(Continued on next page)

They were held in a vertical position with pins, four to a section, that kept the contraction joint perpendicular to the ground during the placing of the concrete and until the finishing machines had passed.

Final preparations for the paving included wetting down the subgrade, oiling the forms, and greasing the dowels at the contraction joints.

Batch Plant

Early in the work the McCalman Construction Co. set up a batch plant just off the eastern end of the job near the town of Casey. Railroad siding facilities were limited, so the Heltzel 100-barrel cement bin was located on the spur track that was available, but the two 100-ton aggregate bins were set up about a quarter of a mile away where there was room to stockpile material. Lone Star air-entraining bulk cement was shipped to the bin on the Pennsylvania Railroad siding from a plant at Limedale, Ind.

Crushed limestone for the larger of the two sizes of coarse aggregate came from the Ohio & Indiana Stone Corp. of Greencastle, Ind. It was shipped in hopper-bottom cars to the siding where it was unloaded by Burch conveyors into trucks that hauled it to the aggregate plant. Three or four trucks, holding 10 tons each, handled the hauling. From the stockpile the material was loaded into a Johnson 100-ton aggregate bin by a Lorain crane equipped with a 50-foot boom and an Owen ¾-yard clamshell bucket.

Sand, and gravel for the smaller of the two sizes of coarse aggregate, were furnished by Barthelemy & Lawrence, and delivered to the plant by truck from a pit 27 miles away. The materials were stockpiled, and loaded into a Blaw-Knox 100-ton two-compartment aggregate bin by a Lorain crane equipped with a 50-foot boom and a Williams 1-yard clamshell bucket.

The Mix

The dry weights of a typical batch of concrete yielding 37.4 cubic feet by volume are given in the following tabulation:

Sand	1,574 lbs.
Stone	1,329 lbs.
Gravel	1,608 lbs.
Water (32 gallons)	267 lbs.
Cement, Type 1-A	740 lbs.
Total	5,518 lbs.

Batches were mixed for one minute, and the concrete had an average air content of 3.4 per cent and a 2.5-inch slump. The gradation of the sand and the two sizes of coarse aggregate fell within the following limits:

Sieve Size	Per Cent Passing: Crushed Stone Size A	Gravel Size B	Sand
2½-inch	100	.....	.....
2-inch	90–100	.....	.....
1½-inch	35–70	100	.....
1-inch	0–15	90–100	.....
½-inch	0–5	25–60	.....
⅜-inch	.....	.....	100
No. 4	.....	0–10	95–100
No. 8	.....	.....	70–90
No. 16	.....	.....	45–75
No. 50	.....	.....	5–20
No. 100	.....	.....	0–5

From eight to twelve trucks, holding two batches each, hauled the materials from plant to paver. Paving progressed from west to east, and trucks dropped off as the haul distance shortened. The maximum haul was just under 4 miles. Trucks first picked up a load of stone under one aggregate bin, then continued east for about ¼ mile to the cement bin. After loading the cement they swung around and returned west, stopping at the other bin for sand and gravel. The cement was thus sandwiched in between the aggregate, and no loss of material was experienced from the wind.

C. & E. M. Photo

A truck-mounted Pitman Hydro-Lift moves forms. Here it has just lifted a 255-pound section onto the truck.

Paving Full Width

Paving was done with a MultiFoote 34-E Duomix paver working outside the forms on the north shoulder of the roadbed. City water was used in the concrete, and supplied to the paver through a 70-foot length of 3-inch hose from a 1,500-gallon tank mounted on a trailer. The pump on the paver pumped the water from the feeder tank. The paver pulled the trailer along by means of a ⅝-inch wire cable a few feet shorter than the hose. The feeder tank was kept filled with water by a 1,500-gallon supply-tank truck. The transfer was made with a Gorman-Rupp 2-inch pump mounted at the rear of the truck, which pumped the water through a 60-foot length of 4-inch fire hose. Only four to five minutes were required to fill up the trailer tank.

From the 35-foot boom of the paver, batches of concrete were deposited in front of a Blaw-Knox paddle-type spreader that leveled off the material 2½ inches below the top of the forms

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Another 3.6 Miles Paved on U. S. 40

(Continued from preceding page)

at the first pass. As it was placed the mix was vibrated along the forms and at the center-line joint by vibrators carried on the spreader. After the first pass the steel mesh was laid in place, more concrete was added, and the spreader with a different adjustment leveled the material even with the top of the forms.

Behind the spreader came a Jaeger Lakewood dual-screed finisher and a Koehring Longitudinal Finisher. From the rear of the latter machine the finishers lifted out the back-up plates at the contraction joints, and replaced the heavy steel protecting cap with a lighter cap more suitable for edging the joints. The surface of the concrete was checked with a 10-foot straightedge, and any laitance was removed with a 12-inch rubber belt. The pavement was given a fiber-broom finish, after which the finishers removed the light cap and edged the contraction joints with a ¼-inch-radius tool. The sides of the slabs were also edged, but not the center joint.

C. & E. M. Photo

Paving goes ahead on U. S. 40. A water-supply tank has a Gorman-Rupp 2-inch pump at the rear. This transfers water to the feeder tank trailer being pulled along the road shoulder by a MultiFoote Duomix paver.

After the finishers had completed their work, the concrete was sprayed with a light mist of water, then covered with Sisalkraft paper for curing. One piece 24 feet wide completely covered the pavement, and underneath that on each side was a piece 18 inches wide. The next day, when the forms were removed, these narrower strips of paper were pulled down to cover the sides of the slabs. The paper was left in place for 72 hours.

Forms were removed by first taking out the pins with the conventional pin puller. Then a truck-mounted Pitman Hydro-Lift picked up the 10-foot form sections, weighing approximately 255 pounds, and placed them on the truck for moving ahead. With this rig, two men besides the truck driver picked up and moved ahead 1,000 feet of forms in only four hours. After the concrete had cured, the transverse contraction joints were filled with asphalt to a depth of ½ inch. Paving progressed at the average rate of 100 feet an hour, or 1,000 feet for a 10-hour day.

Quantities and Personnel

Major items of the contract were:

Earth excavation	169,517 cu. yds.
Borrow excavation	4,400 cu. yds.
Granular borrow	13,700 cu. yds.
Concrete pavement	50,375 sq. yds.
Pavement fabric	50,375 sq. yds.
Reinforcing bars	14,250 lbs.
Pipe culvert, 15 to 54-inch	2,232 lin. ft.

The McCalman Construction Co. employed a force averaging between 100 and 150 men on the project under the direction of A. J. Brady, General Superintendent, with Robert Renfro, Paving Superintendent, and William Ferguson, Plant Superintendent.

For the Illinois Department of Public Works and Buildings, Division of Highways, Don Wagner was Resident Engineer. The project was under the direct supervision of N. E. Sprague, District Engineer of District 5 with headquarters at Paris. The Department is headed by Charles P. Casey, Director, with F. N. Barker, Chief Highway Engineer, and R. H. Tittle, Engineer of Construction.

For the Moto-Bug—a 5-foot power-driven fork lift that can handle 1,000 pounds at a 15-inch load center.

Fork-Lift Attachment

Development of a 5-foot power-driven fork lift for the Moto-Bug has been announced by Kwik-Mix Co., Port Washington, Wis. It has a capacity rating of 1,000 pounds at 15-inch load center, and operates from a power-driven hydraulic pump. Standard forks are 20 inches long and adjust to any required width up to 33 inches. The fork lift can be interchanged with a 1,500-pound-capacity flatbed platform, a 10-cubic-foot-capacity hopper body, or a 5-foot scraper blade.

The Moto-Bug can climb a 12 per cent grade with full loads and has a 61-inch turning radius. A large steering wheel is connected directly to the dual rear wheel through a 3.6 to 1 gear reduction. Power from a standard 6-hp gasoline engine is transmitted by V-belt and roller chain through an automotive-type differential in the front axle for 2-wheel drive.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 640.

Macwhyte Advances Wilder

George C. Wilder is Vice President and Assistant General Manager of Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, wire-rope slings, tie rods, etc. Mr. Wilder, who joined Macwhyte in 1938, was Assistant to the General Manager from 1949 until his present appointment.

Snow-Removal Attachments

A folder illustrating how motor graders can be converted into large-capacity snow removers is available from Caterpillar Tractor Co., Peoria 8, Ill. V-type or straight blades can be mounted in front, and a mast-type wing at the side or a stub-wing on the blade. A blade-wing combination may be formed from the units to clear a path and slope the bank.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 628.

Swamp Buggy Rides High on Wood Tracks

A new type of swamp buggy for operation in soft and soggy areas has been developed by Glade & Grove Supply Co., P. O. Box 198, Princeton, Fla. The unit shown in the accompanying photo transports six men and can haul trailers and timber. It is designed to travel 5 mph while exerting a ground bearing pressure of only 100 pounds per square foot.

To develop the unit, an Oliver tractor was raised 36 inches and its track gage widened from 60 to 84 inches. The bearing length was increased 18 inches. Wood tracks 36 inches long and 4 inches wide provide enough bearing and traction for the tractor to pull a 4,000-pound load.

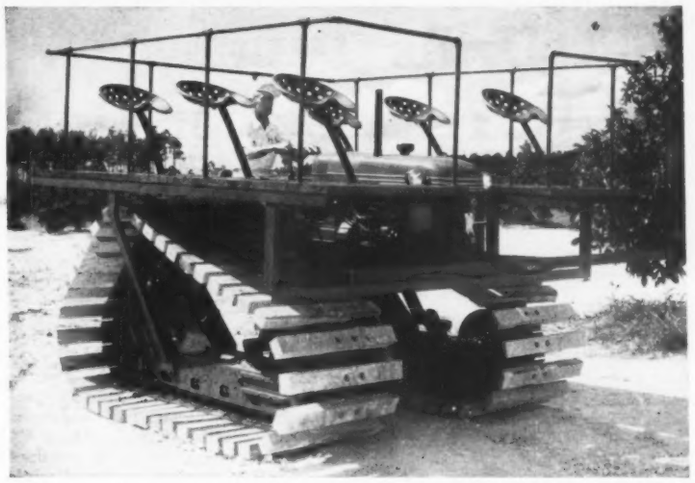
The company reports the unit is now being used on flood control, oil exploration, and pipeline work. Successful operation in deep snows is also expected.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 613.

McPhail Succeeds Nelson In Bureau of Reclamation

Wesley R. Nelson, formerly Assistant Commissioner of the Bureau of Reclamation, has been transferred to the Department of State, where he has accepted an assignment with the Technical Cooperation Administration. H. F. McPhail, formerly Director of Power Utilization for the Bureau, succeeds Mr. Nelson; and Mr. McPhail's place is taken temporarily by Henry B. Taliaferro.

Mr. Nelson, who has been with the Bureau for 24 years, received the Department of the Interior Distinguished Service Award last January. Mr. McPhail, who has been with the Bureau since 1919, has held many important posts and has, to a considerable degree, supervised the tremendous expansion of the hydroelectric capacity of the Bureau to its present total of 4,048,700 kilowatts. He handled the electric designs for such developments as Hoover and Grand Coulee power plants of the Bureau of Reclamation, the Norris and Wheeler power plants of TVA and Madden power plant, Canal Zone.



This swamp buggy, made by Glade & Grove Supply Co., Princeton, Fla., transports six men over wet soggy areas and hauls trailers and timber. It exerts a ground bearing pressure of only 100 pounds per square foot while traveling at 5 miles per hour. The buggy can also be used for traveling over soft snow, the company says.

M-K Drills Tunnel At Yale Power Dam

$26,450,000 Hydroelectric Job Calls for 32-Foot Horseshoe Diversion Tunnel for Lewis River

By RAYMOND P. DAY

• WORKING around the clock seven days a week, the Boise, Idaho, firm of Morrison-Knudsen Co., Inc., is making good progress on the early-stage construction of Yale Dam, on the Lewis River near Woodland, Wash. The $26,450,000 project, designed to provide 100,000 kilowatts of hydroelectric power by the end of 1952, is being built for Pacific Power & Light Co. of Portland, Oreg. Ebasco Services, Inc., is the consulting-engineer firm in charge of design and contract administration.

With additional upstream development, the 100,000-kw power output can be increased to 200,000 kilowatts by drilling two more power tunnels and adding two generating units in the powerhouse. M-K's contract includes construction of the dam, powerhouse, power and diversion tunnels, and related items. When the site was visited, work was moving ahead rapidly on diversion-tunnnel excavation and lining, and abutment stripping had also begun.

Design

Yale Dam is a sand-and-gravel-fill structure rising 300 feet above the riverbed 16 miles upstream from Pacific's 100,000-kw Merwin Dam, built on the same stream in 1931. Yale's design includes an impervious clay core, slanting almost parallel to the upstream slope, which will be sandwiched between random and gravel-rock zones. It was expected that the moisture content of the impervious zone would often be as high as 40 per cent at the time of placement, because of weather conditions through fall and winter.

It will be a big dam, built around a money-saving design. It will be 1,600 feet long at the crest, 1,200 feet thick at the base, and will contain about 4,000,000 cubic yards of earth and rock This total amount also includes a 1,600-foot-long earthen saddle dam necessary to block off a valley in the reservoir area.

Power features include a reinforced-concrete powerhouse connected to the reservoir by two 800-foot-long tunnels 18 feet in diameter. The ultimate 4-tunnel installation will be "stubbed in" as a part of the M-K contract, but actual excavation on two of the bores will be deferred until a later date.

Lewis River is a fast, blue, deep mountain stream of considerable size, rising near Mt. St. Helens and Mt. Adams north and east of Yale. A 32-foot horseshoe-shaped diversion tunnel, capable of carrying 40,000 cfs past the dam site, was included as a part of the contract. In spite of its great size, however, it was expected to be less than half large enough to carry Lewis River through the late fall and winter months, when floods of 116,000 cfs were looked for on a gambling basis of 5 to 3. M-K's plans were shaped around the possibility of the upstream and downstream earth cofferdams being overtopped after the stream was diverted. Work would then be suspended for the high-stage period. When the river went down, the cofferdam area would be pumped out, and work resumed to complete the big barrier in the fall of this year.

Work has been under way since March 15, 1951, when M-K established a 160-man camp near the hydroelectric project and started clearing the site of fir and other evergreen trees which cover the steep-walled canyon slopes.

Tunnel Excavation

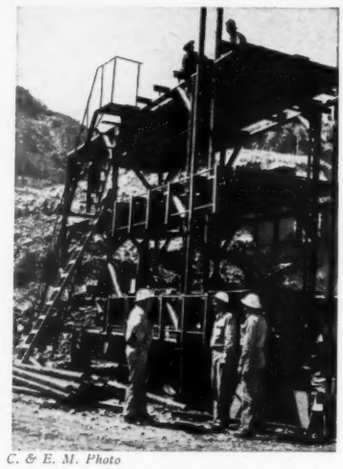
The diversion tunnel, which passes through the right abutment in a formation of solid basalt, was excavated from two portals. Approximately 400 feet of excavation and lining was done from the east, or upstream portal, while the remainder was built from the downstream entrance.

Equipment at the west portal was somewhat different from that at the east. A rail-mounted 3-deck drilling jumbo was used at the west heading. Mounted on its 3 decks were 19 Ingersoll-Rand DA-35 drifters, carrying 10-foot steel and 2-inch Carset detachable bits. The bits ordinarily got approximately 400 feet before they were resharpened on special grinders.

The drilling jumbo also carried a large compressed-air cylinder on each side at the rear. When the two Conway 100 mucking machines and 18 Western dump cars at this heading removed broken muck from a shot, the drilling jumbo, instead of a California switch, changed the empty cars from the rear to the front of the Goodman locomotives which worked this heading. Empties were picked up, one at a time, by the air cylinders. The train backed on through the drilling jumbo. The two hoists then swung over and deposited an empty car ahead of the train, which then moved back to the muckers.

Compressor equipment at this heading consisted of four K500 Ingersoll-Rands, and five 500-cfm Gardner-Denvers. Two 15,000-cfm blower fans forced air back to the headings through 24-inch lines.

On the east-portal heading, only 15 Ingersoll-Rand DA-35's worked from the rubber-mounted drill jumbo. Six 500-cfm Gardner-Denver and Ingersoll-Rand compressors furnished air. Mucking equipment consisted of a



C. & E. M. Photo

The east portal for the Yale Dam diversion tunnel gets under way near Woodland, Wash. Workmen install drills on the jumbo while a superintendents' conference goes on below.

Northwest 60 shovel with an Esco dipper and a short boom, while a fleet of 5 Euclid end-dump trucks hauled the broken material away. Because of the danger of fumes from internal-combustion engines, the "Eucs" were towed back to the heading and then pulled out by a 3-drum American hoist, mounted outside the tunnel on heavy skids. The truck engines did not run during that time.

As is true on most jobs, no hard-and-fast performance or production rules applied to drilling, loading, shooting, or hauling. In general, a 160-hole drill pattern was used in the horseshoe face. The 10-foot holes gave an average breakout of 8 feet per round, and crews completed one round per shift. This made an average rate of progress of 24 feet a day at the active heading.

Powder was Atlas 40 per cent Gelodyn, in 12 x 1½-inch sticks. The explosive ratio was 2 pounds per cubic yard of rock. Firing was from a 220-volt electric line, and 10 Rockmaster delays were used in each blast.

The rock was tricky. It tended to ravel and break after the miners opened up a tunnel through the formation. At least 90 per cent of all the tunnel excavated by the time the job was visited required timber bracing for support. Douglas fir 12 x 12's were set in on 6-foot lateral centers, and 6 x 8's and 8 x 8's were then bolted crosswise. Lagging was 3 x 12 fir, set in place to hold any falling rock. The

(Concluded on next page)

heavy lifts for some of the timber were made by fastening chain hoists and air tuggers at the top of previous bracing and then hoisting the timbers.

Concrete Lining

Plans called for a minimum thickness of 12 inches of concrete lining in the diversion tunnel. Wood forms, a Rex 200 Double Pumpcrete machine, a Rex 2-drum 34-E paver, and a Noble batch plant were used for this work.

Forming was somewhat novel because the job developed so rapidly that M-K was too rushed to order steel forms, which are conventional for this type of tunnel construction. Wood forms were used first to place the curb at invert grade. The flat walls to spring line were then placed inside vertical wood forms held in place by heavy tie bolts. When these forms were filled and stripped, cross timbers went in to support the rounded roof forms covering the top of the tunnel above the spring line. Through the entire process, trains had to use the two narrow-gage railroad tracks inside the bore. During the roof pours, a heavy timber shore between the railroad tracks supported the cross timber, but there was no interference with the movement of trains.

The dry-batched mixes were passed through the Rex paver, mixed with water, cement was added, and the finished product either hauled by fish-tailed trucks or chuted directly to the gob hopper on the Pumpcrete machine. Concrete pumping and placement followed conventional methods.

As soon as the diversion tunnel was finished, Lewis River was diverted through the bore by a heavy rock and earth cofferdam, erected upstream from the structure. This cofferdam will, however, be incorporated in the structure near the upstream toe. It was heavily reinforced with big rocks to resist scour should the river overtop the structure in the high-water period.

After the diversion, the contractor planned to clean the river bottom down to solid basalt rock, and then make every effort to pour the fill-in as rapidly as good work permits. A large borrow and quarry site has been opened up in the reservoir area to produce the earth and rock fill.

Personnel

Field supervisory personnel for M-K include George E. Murphey, Project Manager; Carl Herslof, Tunnel Superintendent; and Roger Evans, Design Engineer for plant erection. J. B. McCamey is Project Manager for Ebasco Services, Inc., and George M. Henderson is Resident Engineer for Ebasco. E. Robert de Luccia is Manager and Chief Engineer of Lewis River Development for Pacific Power & Light.

C. & E. M. Photo

A Rex 2-drum 34-E paver mixes concrete to line the Lewis River diversion tunnel. Minimum thickness for the lining is 12 inches.

Lightweight Building

The use of metal lath and lightweight-aggregate plaster in modern building not only reduces the weight of partitions and fireproofing, but effects a great saving of structural steel. These views, together with a promise of more research into lightweight building construction, were given recently by G. J. Casey of Truscon Steel Co., newly elected President of the Metal Lath Manufacturers Association, Cleveland, Ohio.

Naming some tests included in the Association's research plans, Mr. Casey pointed out that last year the Association worked with allied groups to develop a new lightweight-plaster partition which can retard the spread of fire for two hours. Another interesting test took place last February under the Association's sponsorship. The Underwriters' Laboratories in Chicago conducted fire tests on structural columns which had been fireproofed by a new combination of metal lath and lightweight-aggregate plaster. Indications are, he said, that the new method will provide the greatest fire resistance for a low construction cost.

J. G. Stemples, United States Gypsum Co., was named 1952 Vice President of the Association. Hugh Gallaher, Penn Metal Co., and E. B. Carter, Wheeling Corrugating Co., are members of the Executive Committee together with the President and Vice President. Donald R. Wadle was renamed Managing Director. Other companies which are members of the Association include Alabama Metal Lath Co., Inc.; Bostwick Steel Lath Co.; Ceco Steel Products Corp.; The Goldsmith Metal Lath Co.; National Gypsum Co.

Jordan Is Southco Mgr.

H. J. Jordan is the newly appointed District Manager, Sales and Engineering, of the Southco Division, South Chester Corp., Philadelphia, Pa., manufacturer of rivets and fasteners. Mr. Jordan's territory comprises the Greater New York area and he makes his headquarters at 50 Church St., New York 7, N. Y.

Sundstrand Promotes Nelson

Robert N. Nelson has been appointed Sales Manager of the Pneumatic Division of Sundstrand Machine Tool Co., Rockford, Ill. Associated with Sundstrand since 1946, he was Assistant Sales Manager of the Pneumatic Division prior to his present appointment as Sales Manager.

Nickel Eliminated From New Electrode

To help meet the nickel shortage, a new nickel-free electrode for cast iron has been developed by Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, N. Y.

Although EutecTrode 27 does not replace nickel-bearing electrodes on all applications, it is said to offer an extremely high-tensile weld with a uniform amount of carbon in the deposit, making it similar to a high-tensile high-carbon steel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 610.

Road Builders Hold Anniversary Meeting

Better Highways Through Concerted Effort Is Meeting Keynote; Steel, Secondary Roads, and Job Training Also Highlighted

• OVER 900 delegates gathered in Houston, Texas, January 21 to 24, to celebrate the 50th Anniversary of the American Road Builders' Association. During the four-day convention, members sought solutions to critical road-building problems of today: the inadequacy of our road system, both primary and secondary; the shortage of highway funds; lack of steel, copper, aluminum, and equipment; and the need for more trained graduate engineers in highway work.

Call for Cooperation

A. E. Johnson, Chief Engineer and Acting Director of Highways, Arkansas, sounded the keynote of the convention in his address the first morning. "There is a need and a very strong need", he said, "for a concerted effort on the part of all highway officials; the highway contracting industry; the automobile, tire, and petroleum industries; and all trade and auto-user groups to bring the public the true story of highway problems, especially financing, in a concise and convincing way, so that the public may decide if it is willing to pay for the class of roads that it desires and is now requesting. For too long the views of some of these groups have been at cross purposes, divergent, and plain selfish", said Mr. Johnson. "An allied effort should also help highway department operation, divorce it from political influences as much as is possible, and bring about conditions that will encourage young men to make careers in this field."

The Hon. Dennis Chavez, Democratic Senator of New Mexico and Chairman of the Senate Committee on Public Works, commended Mr. Johnson's report and requested a copy to be entered in the *Congressional Record*. He made it quite clear to the Association that he was cognizant of road problems and would support legislation for adequate funds to meet highway needs. He spoke of putting a new highway bill in the Senate hopper a week prior to the ARBA meeting. This bill calls for Federal expenditures of $270,000,000 for primary roads, $180,000,000 for secondary roads, and $150,000,000 for urban highway developments.

Also during the first morning session, A. C. Clark, Deputy Commissioner of the Bureau of Public Roads, spoke on the status of the Federal-Aid highway system, and Col. Willard T. Chevalier, Past President of ARBA, reported the accomplishments of the Association in the past half-century.

Secondary Roads

Secondary-road problems were of foremost interest in the technical sessions. A. C. Leonard, Chief of the Secondary Road Branch of the BPR, pointed out that social-economics is the prime influence in the construction of secondary roads. Intermittent loss of access across rural areas, though seemingly only a personal loss to one or two farmers, is a national problem when the total effect on agricultural products sales is considered, he said. The limited funds available for county road work make it imperative that road foundations get first consideration, he added; any extra money can later be applied to paving problems. He suggested that placing main emphasis on subbase, drainage, adequate widths, and flat slopes and ditches would permit more efficient use of machinery in construction and maintenance, and thereby reduce over-all costs.

The interest in secondary-road construction was evidenced by many questions from the floor. Asked if the increased cost of a raised roadbed is justified, Mr. Leonard said Minnesota found the saving in snow-removal costs was greater than the increased construction cost. In reply to a question about the economic limits of various types of secondary roads, he suggested the use of calcium-chloride control on roads that carry up to 100 vehicles per day; above this, a switch to traffic-bound pavements; and over 350 vehicles per day, the use of bituminous surfaces. To a question about structures he replied that the BPR will accept precast prestressed-concrete designs, under F-A financing, within certain limitations established by specifications of the Bureau's bridge division. It was his thought that these designs are likely to be a less-expensive substitute for steel than creosoted-timber structures.

L. M. Clauson, Director of the Secondary Road Division, Iowa State Highway Commission, outlined recent developments in soil stabilization on county roads. The rapid depletion of suitable gravel and limestone deposits in this state has focused attention on the problem. Iowa is testing various types of soil blending and stabilization with chlorides, cements, and bituminous products to reduce the quantities of gravel and stone required for new construction and to reduce the current losses of 60 to 80 cubic yards of aggregate from each mile of road each year through wear.

T. P. Williams of the Calcium Chloride Institute, reporting on stabilization methods with calcium chloride, said that it is conducive to low-cost stage construction and can be economically applied to roads carrying from 100 to 500 vehicles per day.

County men got a picture of the materials and equipment outlook for 1952 from H. A. Radzikowski, Chief of the Maintenance Branch of the BPR, and C. J. Haring, consultant to NPA. Other papers at the county-road sessions covered financing, administration, and public relations.

Equipment Outlook

Here's the story on equipment availability as told by Julien R. Steelman, President, Construction Industry Manufacturers Association, Inc. Heavy-duty tractors and shovels will be difficult to obtain. Small shovels and rubber-tired tractors are in line with demand. Crusher manufacturers say they can take care of road-building needs. Light graders probably will be available; heavier units, not. Scrapers vary with make and model; some will be very difficult to obtain. Asphalt plants, blacktop and concrete pavers, and other road units will be in very short supply; Washington figures they are "deferrable" along with highways themselves. Trenching machines are in reasonably good supply and are likely to stay so unless NPA permits more pipeline work this year. Many small tools and specialized units will be available, since the smaller companies can self-certify up to 100 tons of steel per quarter.

All of this, said Mr. Steelman, is on the assumption that demand will be

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about the same as last year and that there will be no sudden change of thinking by the production control men in the Capitol. Apparently, he said, the group in Washington is depending upon the road builders' ingenuity and resourcefulness to keep old machines in operation and get through the emergency.

Value of Expressways

Highway men interested in expressways should have little difficulty selling them to the public if they follow the hard-hitting arguments outlined by Charles M. Noble, Chief Engineer of the New Jersey Turnpike Authority, in his paper "The Economic Value of Expressways". Commander Noble countered an argument that local business suffers through the construction of limited-access roads by presenting data from economic studies made in California. He called for a united effort to obtain the expressways badly needed throughout the country. "There is no need for controversy over free versus toll roads at this time," he said, "for with all the money that can be obtained by various means of financing, it will still require many years to meet the explosive expansion of automotive transportation."

Papers by members of the highway department of the host state pointed out that Texas has developed expressways in four major cities. Additional work on these and new expressways in two other cities is now under way.

D. C. Greer, State Highway Engineer, outlined the Texas urban-expressway program. Administrative control of each expressway is held by a Department-appointed engineer manager. All funds for construction come from state highway sources; local governments supply the right-of-way, based on joint advance planning. The State maintains the facility after completion, except for lighting which is on a 50-50 basis.

Planning is often 15 years in advance of construction, according to W. J. Van London, Engineer-Manager of the Houston Urban Expressways. This permits the city to purchase the *minimum* 300-foot right-of-way. The average total cost of the superhighways is $1,600,000 per mile, though some sections in industrial areas run to $5,000,000. Studies show that the expressways cut travel time in half and pay for themselves in 4 to 10 years. Fatality rates are 60 per cent lower than those on average urban traffic arteries and 75 per cent below the national rate. Property served by the Gulf Expressway has climbed 50 per cent in value, he said. According to all reports, Texans like their expressways and give popular support to the necessary bond issues.

Stabilized Roads

Many of the papers in the technical sessions described the design, construction, and economic benefits of stabilized roads. J. T. Sharpensteen, Genesee County Engineer, Flint, Mich., reported net annual savings of $241 per mile for primary roads and $156 per mile for local roads through the use of calcium chloride to stabilize gravel. He also cited additional social-economic benefits difficult to put in dollar-and-cent values.

Lack of suitable base material is a serious problem in Texas, as in other areas of the United States. H. C. Carter, District Construction Engineer, described the treatment of base aggregates with both waste and commercial hydrated lime as a solution to the problem. Some 87 miles of such roads have been constructed in Texas since the war, using both day-labor and contract methods. The processing is done to depths of 4 to 8 inches, on roads ranging from 20 to 60 feet in width. Three per cent by weight of lime is incorporated into the so-called inferior base materials. Mr. Carter reported that the older projects treated to only 4-inch depths are showing distress, but that where the stabilization has been 6 inches or more the bases are very satisfactory.

Fred L. Goodman, of Barber Bros. Construction Co., gave a detailed summary of soil-cement stabilization work in Louisiana. Over 700 miles of 18-foot roadway have been stabilized in that state since the war. Soils approved for such processing range from sandy soils, requiring 10 per cent cement by volume, to silty clay soils, requiring 14 per cent cement. Bids over the past two years show an average price of 70 cents per square yard for the first group and 85 cents for the second. These prices include an emulsified-asphalt curing membrane used later on as a prime coat for a bituminous wearing surface. There is no reason to believe the peak of work has been reached, according to Mr. Goodman. His outfit alone has 500,000 square

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Road Builders Hold Anniversary Meeting

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yards under contract for 1952.

Traffic tests on soil-cement lanes were reported by James H. Reynolds, Jr., of the Engineer Research and Development Laboratories, Fort Belvoir, Va. They show that soil-cement surfacing not only provides a low-cost reasonably smooth surface, but also increases significantly the carrying capacity of relatively poor soils.

Ben T. Collier, Engineer, Mississippi State Highway Department, cited three typical uses of emulsified asphalt for stabilized-base work. Limited maintenance and low cost of construction are its merits, he said—also the fact that this work takes little equipment and permits full use of unskilled workmen.

Stabilized Runway Base

R. L. Oldman, Director of Public Works, Lubbock, Texas, reported on the reconstruction of airfield runways with soil-cement-stabilized bases. The caliche bases and asphalt penetration surfaces of the runways had deteriorated under heavy civilian and military loads. Mr. Oldman outlined the design and construction of soil-cement bases with penetration asphalt surfacing for the improved runways.

One runway was rebuilt with an 8-inch cement-stabilized base and a quadruple asphalt penetration surface; another had a 6-inch base and a triple asphaltic surface treatment. The contractor maintained a work schedule of 5,000 square yards a day for both base depths. Mr. Oldman emphasized the importance of waiting several months after completion of the soil-cement base before applying the asphalt surface. If this procedure is followed, the shrinkage of the base material will not affect the surface pavement. The runways handled in this manner are now carrying gross loads up to 70,000 pounds, whereas the previous runways had failed under gross loads of 25,000 pounds. Stabilization solved the problem of reconstruction at low cost.

A second paper at this session explored the present status of airport pavement design. Henry Aaron, Chief of the Paving and Soil Branch of the Civil Aeronautics Administration, spoke of the difficulty of determining accurately the bearing strength of subgrades. Until this factor is known, he said, it will be necessary to estimate requirements on the basis of pavement behavior correlated with subgrade conditions. Thus far this has been a satisfactory guide to design.

Cities Need Road Money

New construction financed by bonds should replace temporary stop-gap measures which cities finance with current funds. This was the proposal of Milton Rosen, Commissioner of Public Works, St. Paul, Minn., in his talk "Let's Have Some Action on Municipal Road Construction Now".

American municipalities, he said, are faced with the serious problem of bringing their streets, particularly those not on state trunk systems, up to modern standards of efficiency. The alternative is complete stagnation of motor vehicles in urban areas. Right now, according to Mr. Rosen, millions of dollars are being wasted on maintenance of out-dated streets because not enough cash is available to carry out a planned program of new construction in a short period of time.

He proposed that cities float bond issues for new construction. The saving in so-called maintenance will more than meet the 2 per cent interest charge, he said. Now is an opportune time, for interest rates on street-improvement bonds are lower than 20 years ago, thanks to confidence in these bonds and the taxes which secure them, an increased market, and the tax-exempt status of the bonds. Delay is just adding expense to city road and street work, he told the group.

How to Train Engineers

George F. Driscoll, Associate Professor of Civil Engineering at Notre Dame, outlined a top-drawer program for in-department training of graduate engineers. Training beyond the college level is necessary, he said, but he warned against a haphazard or narrow program. Unless such a program is properly administered, the department will eventually get a reputation for having a fake recruiting program, he said.

The 4-year training schedule should be flexible, with minimum and maximum periods of time to be spent in the various phases of highway work. As the work requirements of the department sections vary, the schedules can be altered to fulfill the contract with the trainee, and at the same time adapt the program to the work load of the department.

After the program has been in effect for 4 to 5 years, *all* bureaus will receive permanent employee assignments and the men will be of greater value because of their broader background. Because of the influence these young men will sooner or later exert on the policies and operation of the department, Professor Driscoll proposed that high ethical standards be set for them, that they be encouraged to develop their abilities in public speaking, and that they take part in nontechnical community activities.

Fred J. Benson, Professor of Civil Engineering at Texas A. & M., gave some tips on how to organize a highway short course. Set it up for a particular group with common interests, he suggested; work with the leaders of this group; select speakers carefully and hold them to a time limit; encourage group discussions; provide entertainment entirely separated from the work; and try to offer comfortable living quarters and study rooms.

Point 4 Needs Roads First

George Taylor Ross, Chief of the Industry and Government Services Division of the Technical Cooperation Administration, Department of State, commended the Pan American Division of ARBA on its work with our good neighbors to the south. This division, he said, carried out significant technical assistance to other nations long before the Point 4 program was launched. Outlining the basic purposes of the Point 4 program, he said that unless priority is given to road construction, other development projects will fail to solve adequately the problems of backward areas. Roads

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must be built to provide access to untapped resources and to open the way for cultivation of potentially rich agricultural lands.

Mr. Ross pointed to the benefits that we would receive in return—economic strengthening of allied democratic nations, an enlarged market for our own products and services, and a more permanent source of raw materials for civilian and defense consumption.

Officers and Resolutions

The membership of ARBA re-elected the following officers for 1952: Paul B. Reinhold, President; Charles M. Noble, Northeastern Vice President; Charles W. Smith, Southern Vice President; M. J. Hoffmann, Central Vice President; A. Diefendorf, Western Vice President; and Jennings Randolph, Treasurer.

New directors are: Paul L. Andrews, Bernard E. Gray, T. B. Hale, J. E. McCracken, Robert M. Reindollar, Paul B. Rynning, and Charles H. Sells.

The following men were appointed presidents of their respective ARBA divisions: Joseph D. Bonness, Contractors; Julien R. Steelman, Manufacturers; Warren A. Coolidge, Municipal and Airport; Julius Kaestner, Jr., County and Local Roads; Prof. Ben H. Petty, Educational; and Dr. Carlos Carbonell, Pan American. The newly organized Materials and Supply Division is under the direction of an executive committee headed by George H. Kimber. This group encourages technical studies and the development of materials and supplies used in highway construction, maintenance, and operation.

In its resolutions, the ARBA endorsed the efforts of the Bureau of Public Roads to gain acceptance of highways as an industrial facility within the meaning of Directive 1 to CMP Regulation 6 (self-certification for projects requiring less than 25 tons of steel). It supported bill S-2436 in Congress for continuation of Federal aid for highway development. It requested a minimum of 500,000 tons of steel per quarter for essential highway activity. And it backed the National Scrap Drive.

In connection with the Supreme Court's Wunderlich decision (denying contractors on Government projects the right to appeal to the courts except in cases of fraud on the part of the contracting officer or department head), the ARBA resolved that appropriate legislation be initiated to make any Government contract, regardless of language, subject to appeal to the appropriate court or courts from rulings of any contracting officer or department head in matters both of fact and of law; and that all existing contracts be modified to permit such appeal.

At the present time ARBA plans to hold its next meeting (February, 1953) in Boston, Mass., and the one after that in Atlantic City, N. J.

Road Development in Liberia

The Republic of Liberia in northwest Africa plans the construction and improvement of some 806 miles of primary roads within a 5 to 10-year period.

The Export-Import Bank has granted Liberia a loan of $5,000,000 to start the program. Construction will begin shortly on about 47 miles of highways outside the capital city of Monrovia. The immediate objective is to improve existing roads totaling nearly 310 miles. The capital investment of the entire program is estimated to be $13,000,000. Current revenues of the national and local district governments will be used to finance construction of a secondary or feeder system of roads.

United States technical missions are working closely with the Liberian government in preparing the highway program, originally recommended by the U. S. Economic Mission to Liberia headed by Oscar W. Meier. J. Clarke Williams is in charge of the U. S. Bureau of Public Roads technical staff advising the Liberian government on the highway program. Three other Bureau engineers will shortly join Mr. Williams and later on additional Bureau personnel will go to Liberia. Included in the help the BPR is offering Liberia is advice on organizing a highway department and setting up a repair and maintenance shop for highway equipment at Monrovia, with suitable training for Liberian engineers and technicians.

Of the six highway projects that are to have priority in construction, the 43-mile stretch between Monrovia and Kakata is to be macadamized immediately. After grading and drainage, a stabilized crushed-stone surface will be put over this section. Other improvements envisaged on the various highways are the installation of additional pipe drainage, alignment relocations, and the construction of bridge and box culverts of modern concrete design.

More scrap metal is needed, so put your scrap to work for more steel.

"Experience has taught me to tie a string to my false teeth before I start."

Rueter Joins Malsbary

Fred A. Rueter was recently named Eastern Sales Manager of Malsbary Mfg. Co., Oakland, Calif., manufacturer of steam cleaners. Mr. Rueter, whose headquarters will be in Pittsburgh, Pa., will supervise the sales activities of the Malsbary specialists now working with jobbers in the eastern and southeastern states.

Data on Wood Preservative

Literature on Cuprinol wood preservative is available from the Cuprinol Division of Darworth, Inc., 51 Maple St., Simsbury, Conn. This preservative is said to prevent swelling and warping, control grain raising, and stop rot and fungus. The volatile material is a metal-base solution of copper or zinc naphthenate with resins and waxes added. One coat is usually sufficient and it dries in about 15 minutes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 694.

New Steam Generator Is Simple to Service

A fully automatic and self-contained steam generator is announced by the Boiler Engineering & Supply Co., Phoenixville, Pa. It is available for use with heavy oil, light oil, gas, or combination, and in sizes from 10 to 500 hp, for 15 to 200-pound operating pressures. Front and back of the boiler can be opened in a few minutes for interior cleaning and servicing.

The Continental is a 2-pass version of the Scotch-marine-type boiler. Efficiency is guaranteed to be at least 80 per cent, with steam-moisture content under 1 per cent. Operation of the burner can be modulated from 35 to 125 per cent, providing for periodic oversurge when required.

To assure maximum heat transfer and low flue-gas temperature, all fuel is burned in the water-surrounded boiler furnace, and the gases pass spirally through large 3-inch tubes. The 2-pass construction eliminates excess refractory, since the only refractory required is at the back of the boiler. A dry pipe in the boiler removes condensate from the steam to keep moisture content low. Also the steam tends to remain dry since a constant water level is automatically maintained, keeping the steam area uniform.

Further information on this generator may be secured from the company. Or use the Request Card at page 16. Circle No. 568.

Bulletin on Air Filter

A device which dehydrates and cleans compressed air is described in a new 2-page bulletin from Hankison Corp., 252 Renton Bldg., 1501 Beaver Ave., Pittsburgh 33, Pa. Measuring 15 inches high x 9 inches in diameter, the Condensifilter has a mechanical filter, a dehydrator, and an automatic trap. When connected to a compressed-air line, it removes entrained and vaporized water and oil, oil sludge, scale, and other foreign materials from the air. Rated capacity is 30 cfm at 100 psi, but when greater capacity or uninterrupted service is required, several units can be installed in parallel.

This literature may be obtained from the company by requesting Bulletin B-30, or by using the Request Card at page 16. Circle No. 693.

The Weathercap fits any vertical exhaust cap from 1 to 6 3/16 inches OD.

Exhaust-Pipe Cover

An improved vertical exhaust-pipe cover is manufactured by Anthes Force Oiler Co., Fort Madison, Iowa. The fully automatic Weathercap, which opens and closes from engine exhaust, seals out rain, snow, dirt, and insects. This protection prevents flooded pistons, cracked cylinder heads, and rusted or warped valves. The cover is built of heavy-gage steel and fits any size of exhaust pipe from 1 inch to 6 3/16 inches outside diameter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 578.

New Concrete Paint

A paint for interior or exterior concrete, concrete block, brick, and stone is announced by Smooth-On Mfg. Co., 572 Comunipaw Ave., Jersey City, N. J. It does not require any primers or sealers and can be applied to surfaces that are painted or unpainted, dry or damp. One gallon covers approximately 400 square feet and one coat is usually all that is required, the company points out. No. 15 paint is also said to have high resistance to water, acid, or alkaline attack, and can be washed without damaging the finish.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 692.

Broderick & Bascom Elects

David Larkin, former Executive Vice President of Broderick & Bascom Rope Co., St. Louis, Mo., was recently elected to the board of directors of the company. A. A. Grosse, hitherto Assistant Treasurer, now fills the additional position of Secretary, replacing Joseph H. Bascom, who has become Executive Vice President and Treasurer.

TRADING POST

CLASSIFIED ADVERTISING

An advertising inch in the Trading Post is measured ⅞-inch vertically on one column. Space reservations close in the New York office on the 10th of the month preceding publication. Send your classified copy to:

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1—"Caterpillar" Model 212 motor grader.

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These machines are in good mechanical condition and have produced up to 100,000 cu. yds. per season of state specification material.

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Walking draglines, 3, 5, 6, 7, 12 yds.
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Give Generously to the Red Cross

INDEX TO ADVERTISERS

Self-loaded D TOURNAPULL moves 85 pay yards hourly

Self-loaded D Tournapull picks up 5 pay yards of clay in 45 to 60 seconds.

for Texas contractor

"Nothing compares with the LeTourneau D Roadster Tournapull for moving dirt," said Contractor J. Ralph Fenton, when his rubber-tired Roadster finished a tough 17,000-yd. job on the Richardson & Ware Highway near Longview, Texas recently. Working right after heavy rain storms, the mobile, high-speed "D" placed an average of 85 pay yards of heavy, wet clay hourly on 800′ cycles.

In typical operation, it self-loaded 5 pay yards in about 50 seconds . . . completed the 800′ round trip over slick footing in 2.9 minutes . . . made 17 trips per 50-minute hour. Cycle time included 1 minute 15 seconds to haul 400′ . . . 10 seconds to spread . . . 40 seconds to make 90° turn and drive 400′ back to the cut.

"This D Roadster is fast and moves a lot of dirt," says Operator J. A. Bollenger, Rt. 2, Longview. "It's a man-saver and has brakes that really hold. I like its fingertip controls, too."

15 m.p.h. job-to-job

Owner Fenton also likes Tournapull's ability to drive under its own power from job-to-job. To reach the Richardson Highway site, the high-speed "D" traveled 5 miles through the city of Longview in 20 minutes.

Check into this 7-yd. Tournapull for yourself. Find out what its fast electric controls . . . 28 m.p.h. "go-anywhere" mobility . . . and self-loading versatility can do for you in your work. Your LeTourneau Distributor will be glad to show you job records of the "D" on both self-loading assignments and in pusher-fleet operation.

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